

HITCHCOCK'S *Machine Tool* **BLUE BOOK**

FOUNDED

APRIL 1938

1905

HARDINGE *Bench Lathes* at FIRTH-STERLING STEEL C



THE LARGEST BUILDING
IN THE U.S.A. FOR MANUFACTUR-
ING TUNGSTEN CARBIDE TOOLS
AND DIES.

TYPICAL
WIRE-DRAWING DIE

AN INTERESTING COMMENT:

With the manufacture of Firthaloy tungsten carbide dies, we have found the HARDINGE "Cataract" BB59 Precision Preloaded Ball Bearing Bench Lathe to be indispensable for maintaining consistent accuracy.

"The units in our Firthaloy die shop are capable of working to the extremely rigid tolerances we must adhere to when making dies, and, also, gauges to check the dies.

"The combination of high speed and accuracy in these machines, together with the feature of rapid change through a variety of speeds, has made it possible for us to supply uniform dies in quicker time."

FIRTH STERLING STEEL COMPANY,
MCKEESPORT, PENNSYLVANIA.

FIVE SIZES 10" COLLET CAPACITY

SECTIONAL VIEW SHOWING A BATTERY OF HARDINGE "CATARACT" PRECISION PRE-LOADED BALL BEARING BENCH LATHE, AT THE FIRTH-STERLING PLANT.

• HARDINGE "Cataract" Bench Lathes are also used by Firth-Sterling sub-stations throughout the United States for reworking wire drawing dies. Send Quickmail Coupon No. 1 for full details on these modern Bench Lathes. Hardinge Bench Lathes for Production, Tool-room and Laboratory Departments

HARDINGE BROTHERS INC., - - ELMIRA, N.Y.
CHICAGO - NEW YORK - DETROIT - HARTFORD - PHILADELPHIA - CLEVELAND

MARVEL

SAWS

You are paying too much for cutting-off

unless you have one or the new heavy-duty, super high speed MARVEL Automatic Hack Saws, you are paying too much for cutting-off. No other machine of comparable accuracy will cut off an equal number of pieces from bar stock in diameters up to 10" with such speed, at such low labor cost, power cost, tool cost or with such small chip load. Far heavier, and all ball-bearing, these MARVEL automatic Saws No. 6A and 9A are built for continuous operation at high speeds and feeds and blade tensions impractical for other equipment. They will cut off identical lengths, 10 pieces of 6" round, 160 pieces pieces of 1½" round every hour floor-to-floor, and other sizes proportionally. They cut off squarely and accurately—*save stock and machining.*

While strictly production tools at require no more attention than an automatic screw machine, MARVEL Automatics are also multi-purpose; will handle all run the shop sawing easily and efficiently—bar push-up can be disengaged at any point, miscellanea cuts made, and automatic operation resumed by re-engagement of bar feed drive. For miscellanea sawing where the number of identical pieces does not justify

automatic bar push-up, MARVEL No. 6 or No. 9 will do the same low cost, high performance. Available with direct belt drive, 4-speed motor drive, single speed motor drive, motor drive with 4-speed transmission.

Send Quickmail Coupon
No. 5 for catalog.

ARMSTRONG-BLUM MFG. CO. The Hack Saw People CHICAGO

CHOOSE

from this

Complete Line of Air Control Valves

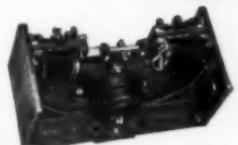
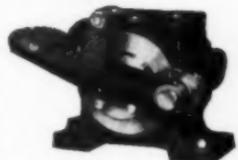
Hannifin disc-type air control valves give the positive and accurate control of air operated equipment that means economical use of air power and smooth, easy handling.

The complete line of standard types includes hand and foot operated models, spring return, heavy duty, manifold, and electric types for all air control requirements. Made by specialists in pneumatic and hydraulic equipment, they assure improved operation and end costly interruptions and repair expense.

Write

for Valve Bulletin 34-H with complete listings for all types.

Use Quickmail
Coupon No. 47



Simple "Pack-Less" Design: Hannifin disc-type valves have but four parts and a handle—there is no packing. The bronze disc is ground and lapped to make a perfect seal with the seat. Re-lapping at long intervals maintains efficient, leak-proof operation.

Standard Hand Control Valves: Four-way type for control of double-acting cylinders, for air or hydraulic pressures to 150 lbs./sq. in. Four standard types, 45 to 90 degree movement. May also be used for three-way control of single-acting cylinders. Also duplex types for control of two double-acting cylinders.

Spring Return Valves: Give instant reversal of cylinder upon release of pedal. With 45 degree movement, no shut-off position.

Rotary Type Valves: Heavy duty foot operated ratchet action. One pressure operates the cylinder, second pressure reverses the cylinder.

Electric Types: Single and double electrically operated valves for remote control, time cycle operation, four-way control, for a variety of standard and special applications.

Manifold Types: Concentrate control of several cylinders with easier handling and simplified piping. Four standard types, 45 to 90 degree movement, and spring return types, for various cycles of control.

HANNIFIN MANUFACTURING COMPANY

621-631 South Kolmar Avenue, Chicago, Illinois

ENGINEERS • DESIGNERS • MANUFACTURERS • Pneumatic and Hydraulic Production Tool Equipment

"Packless"

AIR CONTROL

Spring tempered COLLETS



Order From Stock

Scientifically heat treated to a true spring temper, "Rivett Mark" collets resist wear and hold their spring longer than collets of any other make. As standard equipment on all makes of lathes and millers, (see Rivett Bulletin 100B) they may be ordered for immediate delivery from the following stocks:—

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BOSTON

Rivett Lathe & Grinder Inc.
18 Riverview Road, Brighton

RIVETT

LATHE & GRINDER INC.
BRIGHTON, BOSTON, MASS.

Cut Drilling & Tapping Costs.

With
Grand
Rapids
Combination



Drill
and
Tap
Grinders

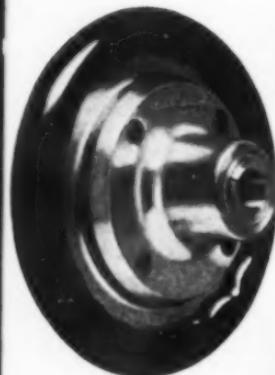
TAPS and drills cut faster and do better work when they are kept sharp—they last longer when they're correctly ground. Grand Rapids Combination Grinders do the grinding in half the usual time—with a degree of accuracy and precision that eliminates tool breakage. That's the Grand Rapids method of cutting costs and saving money on drilling and tapping.

We make many types and sizes in addition to the 10-B Combination Tap and Drill Grinder illustrated.

Quickmail Coupon No. 72 will bring the whole story promptly.

MANUFACTURED BY

GALLMEYER & LIVINGSTON CO.
405 STRAIGHT AVE., S. W. GRAND RAPIDS, MICH.



SJOGREN

PRONOUNCED (SHOO-GRIN)

SPEED COLLET CHUCK

For Your Tool Room and Engine Lathes

- Saves Time
- Increases Capacity
- Eliminates Keys and Wrenches
- Increases Production
- Affords Greater Accuracy
- Three sizes up to 1 3/4" Capacity

"Saves Time and Increases Accuracy"



In use on Milling Machine

In use on Engine Lathe

The amazingly fast action of the Sjogren Speed Collet Chuck gives it full right to its name! An almost effortless turn of the handwheel, one way or the other, automatically opens or closes the collet, releasing or gripping the work as desired. Its grip is adjustable and sure. Most operators simply lay a hand on the wheel and run the lathe forward to tighten the collet . . . reverse to loosen.

METHOD OF MOUNTING: An intermediate plate is used to adapt the Sjogren Speed Chuck for machines with threaded nose spindles. It is mounted in the same manner as an ordinary 3 or 4 jaw chuck. Also, it is furnished complete, ready for use with machines having standard tapered key-drive or cam lock spindles.

With the Sjogren Speed Collet Chuck, the operator is always in front of his work and he stays there! There is no need to reach over—or to walk back of the lathe headstock—to grip or release material in the collet.

Through the increased production and machinist efficiency caused by the elimination of lost time and lost motion, the Sjogren Speed Collet Chuck more than pays for itself! Write today to the nearest distributor or use Quickmail Coupon No. 2.

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Ray H. Morris & Company, Inc.	7 South Main Street	West Hartford, Conn.
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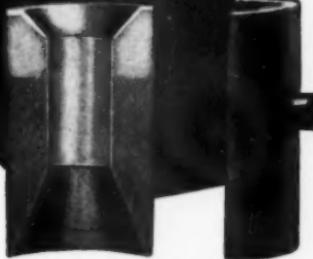
SJOGREN MANUFACTURING COMPANY

MORRISON MASTER FEEDING FINGERS



MORRISON

MASTER FEEDING FINGERS
WITH *Replaceable* PADS
WILL SAVE 30% to 80% OF
FEEDING FINGER REPLACEMENT
COST -



REPLACEABLE PADS IN
HARDENED STEEL, NICKEL
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REAL ECONOMY

for

Brown & Sharpe, Cleveland, Cone, Davenport,
Gridley, National Acme, New Britain and all other
makes of automatic screw machines.

Send Quickmail Coupon No. 3 for four page descriptive bulletin

MORRISON MACHINE PRODUCTS, INC. ELMIRA, N. Y.

COLLETS - FEED FINGERS - PADS - FORM TOOLS
FOR
ALL MAKES OF AUTOMATIC AND HAND SCREW MACHINES

Assures
Accurate Precision
Dressing

Lower
Production
Cost

DIAMITE

Wheel Dressing

TOOLS

Adapted
For All Makes
Of Grinders

Requires
No
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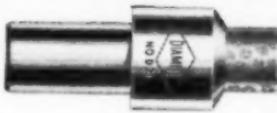
No. 98 Diamite Wheel Dressing Tool

Standard holder, $\frac{7}{16} \times 1\frac{1}{2}$.
Other size holders furnished
upon request.

Recommended for dressing
wheels up to 24" in diameter.

Price **\$15.00** each

Patented: United States, Canada,
France, England, Sweden,
Belgium, Italy
Other Foreign Patents Pending



No. D-21 Diamite Wheel Dressing Tool

Standard holder, $\frac{7}{16} \times 1\frac{3}{4}$.
Other size holders furnished
upon request.

Recommended for dressing
wheels 24" to 36" in diameter.

Price **\$20.00** each



SECTIONAL VIEW

These tools will render accurate,
precision dressed wheels
for either finish, semi-finish
or roughing operations. Eliminate
your diamond worries and order DIAMITE tools
from our large stock.



SECTIONAL VIEW

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DRILL JIG BUSHINGS, GRINDING SPINDLES, HYDRAULIC POWER UNITS,
PRECISION BORING, TURNING AND FACING MACHINES, PRECISION
THREAD GRINDERS, COUNTERBORES, BROACHES, CARBIDE TOOL
GRINDERS, CARBOLY TIPPED TOOLS, SPECIAL HIGH PRODUCTION
MACHINES, GROUND FORM TOOLS, PRECISION PARTS, MILLING CUTTERS

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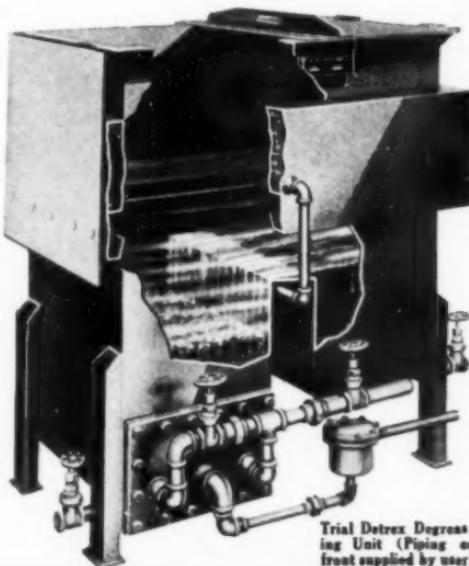
You Run The Test In Your Own Plant

The logical way to check up on the economies offered by the Detrex Solvent Degreasing Process is to make a thorough test—right in your own plant—with your own men—under your own actual operating conditions.

You will find, as have many others, that this superior metal cleaning process is more rapid . . . more flexible . . . more convenient . . . and more economical. It will enable you to do a better cleaning job at lower unit cost.

We will be glad to let you judge the merits of the Detrex Solvent Degreasing Process—on a three weeks' free trial — without capital investment — without obligation on your part to buy.

Send Quickmail Coupon No. 15 TODAY for free descriptive booklet—and details of our trial offer.



Trial Detrex Degreas-ing Unit (Piping on front supplied by user)

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...GRIND DOWN COSTS with
SKILSAW DISC SANDER!**

Eliminate slow, costly hand grinding, filing and sanding—seve considerable time, labor and money with one of these fast, powerful SKILSAW Disc Sanders . . . that do the job better, easier, quicker! Used for flat, concave and convex surfaces of metal, wood, stone, marble, tile and compositions—with grinding wheels, wire brushes, polishing pads, etc. Just try SKILSAW Disc Sander on your work . . . and you'll quickly see how much it will save for you!

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1253 S. Flower St., Los Angeles 2065 Webster St., Oakland
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There is a model for
every sanding and
grinding problem!



FOR INTERMITTENT USE
NEW! For intermittent
grinding of welds and sand-
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FOR HEAVY DUTY USE
A very powerful tool for
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grinding jobs in intermit-
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FOR PRODUCTION USE
Specially powered for con-
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cleaning and grinding with
cup wheels or wire brushes. Weighs 14 lbs. . . . \$80

Sold by leading distributors
of mine, mill, hardware
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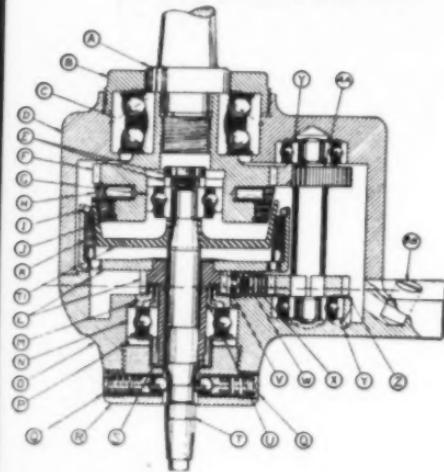
PORTABLE ELECTRIC TOOLS

SAWS • DRILLS • BELT SANDERS • DISC SANDERS • GRINDERS • BLOWERS •

SAVE MONEY IN
EVERY INDUSTRY!

YOU, YOU AND YOU

Asked for THIS



7 EXCLUSIVE FEATURES

1. All Spindles running in standard ball bearings.
2. All revolving parts lubricated by oil bath.
3. Mechanical labyrinth oil seal to keep oil inside taper.
4. Ease of oiling thru plug "BB" acting as overflow and making over-oiling impossible.



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FOR
THIS
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BOOKLET.

THE CHARLES
MIDDLETOWN

TAPPER

COMPLETE NEW
1938 DESIGN

5. All parts interchangeable including actual frictions which are held tight by the locking spring "I" and "J".
6. Tap Chuck will automatically go into neutral and stop when frictions are not engaged (letter "Q").
7. Positive drive single purpose collet chuck, light in weight, extremely accurate. Collets available for all taps, sizes from No. 2 to $\frac{3}{4}$ inch.



L. JARVIS CO.
CONN.

R

AND

L

Turning Tool Better... for 3 Reasons



Check these money-saving, budget-paring reasons why the R & L Tool is a sound investment for you:

- 1 **FIRST COST**—The R & L saves you more than \$200 in initial cost alone, compared with the separate and more costly tools required to do the same work.
- 2 **TIME**—The R & L is adaptable to so many different jobs and saves so much time in setting-up. You cut operation time too, for if necessary, the R & L can do three jobs at once—turning, drilling and burnishing at one operation as shown above. R & L does the work of 14 tools costing four times as much.
- 3 **MAINTENANCE**—The R & L is sturdy and simply designed with a minimum number of wearing parts, which reduces upkeep costs.

Send Quickmail Coupon No. 64 for booklet showing R & L Tools in operation on all kinds of work and giving complete instructions for their use.

**R and L Tools, 1825 Bristol St.,
Nicetown, Philadelphia, Pa.**

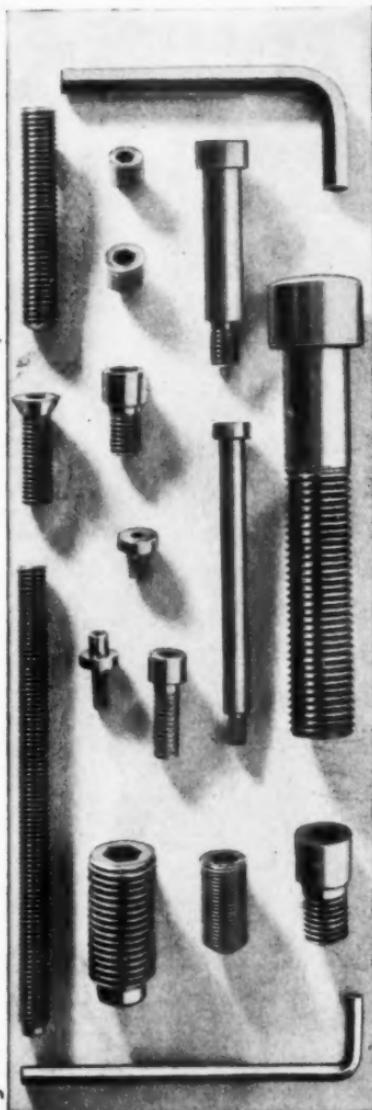
"SAFETY" SOCKET SCREWS

- We make a complete line of Safety Socket Screws—of the finest workmanship and materials—conforming in every way with the most precise standards of quality.
- We also manufacture Milled Studs and carry a stock of standard sizes. Prompt service on special designs.
- Special Safety Socket Screws made to your specifications of any material required—brass, bronze, monel metal, stainless steel etc.
- Send us your blueprints. Let us quote prices and submit samples.

*SEND FOR
your copy of
our complete cata-
log.*



Stick Coupon No. 41 to your letterhead
for prompt action

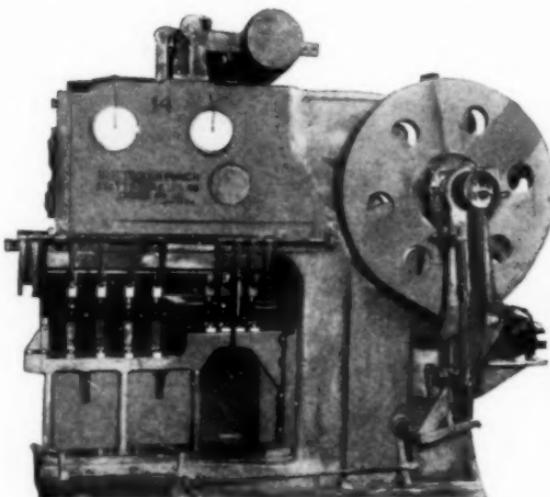


SAFETY SOCKET SCREW CORPORATION
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BEATTY
TOGGLE
DRIVEN
BEAM
PUNCHES

GIVE
YOU:

- 1—More Die Space
- 2—Deeper Throat
- 3—Longer Stroke
- 4—Greater Capacity
- 5—Higher Pressure
- 6—Less Power Consumed
- 7—Lower Maintenance
- 8—Least Floor Space



For punching extra large structural shapes and manufactured parts—with double gag punching and die holders—two diameters on each pitch line which saves time, money and re-handling as two-diameter holes can be punched on same pitch line without loss of time changing tools. Control levers are provided for production or duplicate punching. Gag can be operated singly by detaching levers.

●
SPECIFICATIONS

	No. 13	No. 14	No. 15
Face of slide, r to l, std. maximum	12 1/2"	12 1/2"	13"
Face of slide, front to back	24	24	34
Die space	48	60	60
Stroke	42	48 1/2	48 1/2
Throat	2	2 1/2	3
Face of table, front to back	25	28 1/2	34
Face of table, r to l, std.	46	60	64
Face of table, maximum	22	22	28
Capacity	30	34	38
Shipping weight, lbs.	200T	300T	400T
Motor required, H.p.	42,000	57,000	76,000
Punching capacity	7 1/2	10	15
Spacing table to suit requirements.	2 holes, 1 1/8" thru 1"	4 holes 1 1/8" thru 7/8"	4 holes 1 1/8" thru 1 1/4"

Quickmail Coupon No. 48 will bring you folder 1500-A and full information.

BEATTY MACHINE & MANUFACTURING CO.
 954 - 150th ST. HAMMOND, IND..

1905



1938

FLEXIBLE SHAFTS AND MACHINES

THE POLISHING OF
STAINLESS STEEL

IN MANY SHAPES AND SIZES
IS EASILY ACCOMPLISHED
AT THE PLANT OF

LIQUID CARBONIC CORP.
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PRECISION TAPPING EQUIPMENT

plus



FOR EXAMPLE

Tapping brass back plates of an electric automobile clock to extremely close tolerances. A simple slide fixture, designed by Haskins Engineers, and the sensitive Haskins tap head, eliminating the necessity of a hold-down, more than double production. The fixture moves in a fixed guide against stops at both ends so that the operator need not line up the holes for tapping.

An important part of the Haskins Method is the designing of fixtures that insure the user maximum profit from the exclusive advantages of the Haskins Tapper.

Tapping jobs of practically all kinds are now being done faster and more economically because of these two factors—skill and experience of Haskins Engi-



HASKINS PRECISION
Tapping Equipment

WHITNEY TOOLS

MADE BY SPECIALISTS TO MEET EVERY
NEED OF PRACTICAL SHEET METAL MEN



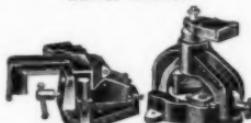
No. 10 Ball Bearing Punch

Capacity $\frac{3}{8}$ inch through $\frac{3}{4}$ inch iron. Depth of throat $1\frac{1}{8}$ inch. Height of throat $\frac{3}{8}$ inch. Furnished with one punch in any size from $\frac{3}{8}$ to $\frac{3}{2}$ by $\frac{1}{16}$.



No. 4 Angle Iron Shear

Capacity $2\frac{1}{2}'' \times 2\frac{1}{2}'' \times \frac{3}{4}''$ angle iron or smaller.



Angle Mitre Notcher and Angle Iron Bender

Capacity $2\frac{1}{2}'' \times 2\frac{1}{2}'' \times \frac{3}{4}''$ angle iron or smaller. A pair of tools that every shop ought to have. They are Nos. 50 and 51 in our catalog.

Whitney manufactures more than 80 types of Shears, Punches and other tool equipment for metal working — dependable items perfected through long experience and close contact with the trade — tools that have "always made good."



Imperial Roller Bearing Punches

—offered in 3 sizes—will work inside 90 degrees. Quick changing for punches and dies —no cams to wear—stripping action is positive.

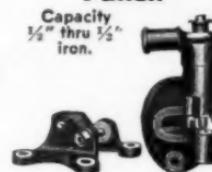
No. 20 Ball Bearing Punch

Capacity $\frac{3}{8}$ thru $\frac{1}{2}$ inch iron.



Aircraft Rivet Squeezer

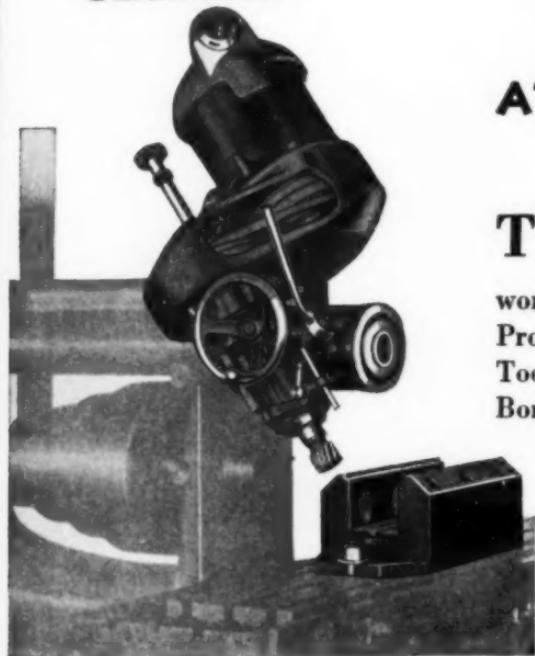
Capacity $\frac{3}{16}$ inch aluminum rivet. Spindle travel $\frac{1}{2}$ inch. Made in 5 sizes, with throat depths from $\frac{1}{4}$ to 6 inches.



Quickmail Coupon No. 42 will bring you the complete Whitney catalog.

WHITNEY METAL TOOL CO.
ROCKFORD, ILLINOIS

***HIGH
Bridgeport
SPEED***



**"MASTER"
MILLING
DRILLING
BORING
ATTACHMENT**

THE Bridgeport "Master" has proved its worth whether it be on Production Applications, Tool and Die or Exacting Boring Work.

As a Tool Room Unit it will pay for itself in a very short time.

It is indispensable to the small tool shop owner who

for the first time can do fast milling and boring with a precision tool that does not involve a heavy financial burden.

Coupon No. 10 will bring you illustrated folder giving full information.

BRIDGEPORT PATTERN & MODEL WORKS

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270° of
**CHASER
GRIND**

is Real Economy



WITH these Namco circular chaser type die heads you can grind and regrind to a full 270° of the chaser circumference. This means never less than 10 times the life of ordinary chasers. • You can remove 4 chasers in 40 seconds or less, and after each grind you can reset them "dead accurate" almost as quickly. This turns a large part of normally slowed down time into productive time. • And with Namco design simplicity, ruggedness and precision as fine as modern equipment affords, you can be certain that threads cut after your last grind will be identical with the first—you increase speeds and *hold* accuracy. • If these factors are your measure of REAL threading economy, then all we ask is a chance to prove them on any job, any machine—any time. Write THE NATIONAL ACME COMPANY, Cleveland, Ohio.



Opening Dies and
Collapsing Taps
•
Acme-Gridley Automatic
Screw Machines—4—
6 and Single Spindle
•
Automatic Chucking
Machines
•
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for idle time control
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•
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NATIONAL ACME



**USE
Contour
Machining
on DOALL
and
SAVE!**

30" THROAT CAPACITY

Contour machining saws openings in metal and shapes parts in large or small radii with special temper narrow saws. It is not to be confused with straight sawing. The DOALL is a machine tool providing precision results in steel up to 8" thick as well as in other materials. The machine also files and polishes.

Contour Machining is industry's newest cutting process and its startling savings merit immediate investigation.

NOTE:

See actual sawed cut. Only this .040" kerf is removed with contour sawing. Radii as small as $\frac{1}{16}$ " may be sawed.

For PROOF OF SAVINGS WITH DOALL—

- 1—Write on your letterhead for free demonstration of Doall in your plant.
- 2—Use Quickmail Coupon No. 44 to request new **FREE** case record book describing experience of Doall users—

"25 WAYS TO CUT MACHINING COSTS"

CONTINENTAL MACHINE SPECIALTIES, INC.
NEW YORK 1301 S. WASHINGTON AVENUE, MINNEAPOLIS, MINN. CHICAGO



Haskins Flexible Shaft Equipment with screw driver attachment is used in the plant of Edwin I. Guthman & Co., Inc., Chicago. Results: faster production — less breakage — less operator fatigue — lower costs.

ROUGH AND READY WHEN THE JOB DEMANDS IT

General casting grinding with Haskins Equipment. To meet the requirements of all kinds of cleaning, polishing, sanding and grinding jobs, there are more than 25 different types of Haskins Flexible Shaft Equipment.

More work with less effort! There seems to be no limit to the variety of jobs this versatile equipment can handle. How about your plant? Our catalog illustrating a great variety of equipment and many unusual applications may give you a money-saving idea. Send for it with Quickmail Coupon No. 65. R. G. Haskins Company, 4654 W. Fulton St., Chicago.

HASKINS *Versatile*
FLEXIBLE SHAFT
EQUIPMENT



HS-7
EQUIPMENT
1 H.P. motor,
4 speed coun-
tershaft, Tim-
ken roller-
bearing spin-
dle. 3-wheel
truck.

KELLERFLEX

INSTEAD OF

“Muscle” Finishing

A prominent machine tool builder used Kellerflex Flexible Shaft Machines in the following operations—and the savings were enormous!

- Removing excess filler from castings
- Cleaning castings before painting
- Polishing stainless steel
- Burring gear teeth
- Burring keyways
- Breaking corners on oil grooves
- Balancing pulleys
- Grinding forgings
- Finishing dies
- Finishing and altering metal patterns
- Finishing sheet metal cabinets
- Finishing between the ways on machine beds
- Filing brass, bronze and aluminum castings
- And many other filing and finishing operations

These are only a few of the hundreds of applications possible with these powerful little machines. Wherever you find hand finishing, let us show you how Kellerflex will do the same job better—and in less time. Write the Kellerflex Sales Department, Pratt & Whitney, Division Niles-Bement-Pond Company, Hartford, Conn.

*Use Quickmail Coupon
No. 66*

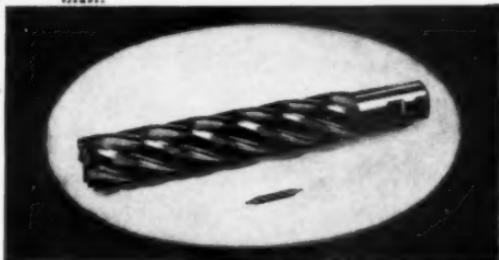


Here is a typical application of Kellerflex—smoothing up small castings with abrasive belts. They are easy to mount in the convenient ball bearing handpiece, and they produce a better surface. The Kellerflex JB-1, shown at the left, was used on this job. Write us for complete information.

PRATT & WHITNEY



Large
..or *Small*



PUTNAM END MILLS **Cut Faster • Last Longer**

Possibly your requirements seldom call for end mills of $1/16"$ diameter. However, if they do, Putnam can furnish them . . . accurately machined . . . heat treated to offer the utmost protection against breakage . . . and guaranteed for perfect performance. Or, if you need end mills of $2"$ diameter . . . or any other size within this range . . . you will find the exact tool—designed and made to give you extremely satisfactory results—in standard or special Putnam High Speed End Mills.

Every Putnam End Mill is made of genuine high speed steel. It is heat treated by immersion in temperature controlled salt baths, the most modern process in use today. It is tempered and finished by methods that are the "last word" in up-to-the-minute efficiency. You'll find it to your advantage to have complete information and prices on Putnam End Mills.

SEND QUICKMAIL COUPON No. 67 . . . TODAY!

PUTNAM TOOL COMPANY
2983 Charlevoix Avenue • Detroit, Michigan



CANEDY-OTTO

The C-O No. 3000 F-V brings you everything you'd expect to find in a modern sliding head sensitive floor drill—and more. Six speeds—full ball bearing spindle—two ball bearings in spindle cone pulley and a self-aligning ball bearing on motor bracket. Quick and easy speed change—ratchet type feed lever and many other superior features.

The C-O 15" Ball Bearing Multiple Spindle Drills are designed for high production, to give the greatest degree of accuracy and speed. Individual motor drives permit operating each spindle at any desired speed, stopping or starting without interference to other spindles. Elimination of idlers, intermediate cone pulleys, twisted belts, etc., reduces friction and permits use of smaller motors.

Ready for the Job

C-O units come fully equipped with attachment cords, switches, belts, etc., ready for immediate operation without the purchase of any additional equipment. Multiple Spindle Drills are available equipped with from 1 to 6 spindles.

Quickmail Coupon No. 11 will bring you full information pertaining to the C-O Line.



CANEDY-OTTO MFG. CO.
CHICAGO HEIGHTS, ILL.



101
DIFFERENT
JOBS
IN YOUR
OWN SHOP
ON
COLONIAL

*Light
Duty*
(2 TON)

BROACHING

Surface, keyway or hole
Sizing round and splined
holes

Small diameter irregular
holes

Burnishing holes with
push broaches

PRESSING

Assembling Bushings,
Pins, etc.

General assembly work
on small parts

Burnishing holes with
steel balls, etc.

*If your work tends to run to somewhat heavier work there
is the Colonial Utility Press ranging from six to 10 tons.*

COLONIAL BROACH COMPANY
147 Jos. Campau • DETROIT, MICHIGAN



SOLID
TYPE

REMOVAL
TIP

WEAR
STRIP

THE SCULLY-JONES BRAZING
PROCESS INSURES UNIFORMITY



These new inserted blade core drills were designed in conjunction with the Haynes-Stellite Company to make possible for you to save one-half the time at one-third the cost. For further details send your blue prints or requirements to our Engineering Dept.

Use Quickmail Coupon No. 40

SCULLY-JONES & COMPANY
1905 SOUTH ROCKWELL STREET • CHICAGO, ILLINOIS

Sundstrand

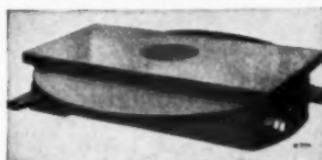
Money Saving Tools

No. 3 Hand Millers—Ideal for rapid, low-cost milling of parts for business machines, electrical instruments, fire arms, gauges, small tools and experimental work within their capacity. They are easy to set up, simple to operate; accurate, rigid, dependable. Also available in column-type.



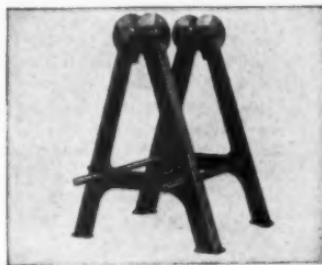
No. 3 HAND MILLER

Index Bases—Sundstrand Index Bases cut machining costs and speed up production. They are low, compact; have simple, single-lever operation; extremely rigid clamping. Indexing can be manual or automatic. They are made in six sizes, for all makes of machines.



INDEX BASE

Balancing Tools—Sundstrand Balancing Tools provide a quick means of balancing gears, shafts, fly-wheels, pulleys and many other parts. They are simple to use, highly sensitive, extremely accurate; save time and money on all balancing, straightening and truing operations. Made in 9 sizes, up to 24,000 pounds capacity.



BALANCING TOOL

Bench Centers—Used extensively for testing and checking parts between centers. Sundstrand Bench Centers are rigid, compact, portable; available in capacities up to 12" swing and 60" between centers.



BENCH CENTER

MANUFACTURERS—Investigate these convenient, money saving tools. Write, today, for literature.

DEALERS—The high quality Sundstrand Tools shown at right are open line items; provide exceptional possibilities for additional sales. Investigate. Write, today, for literature and prices.

Use Quickmail Coupon No. 7

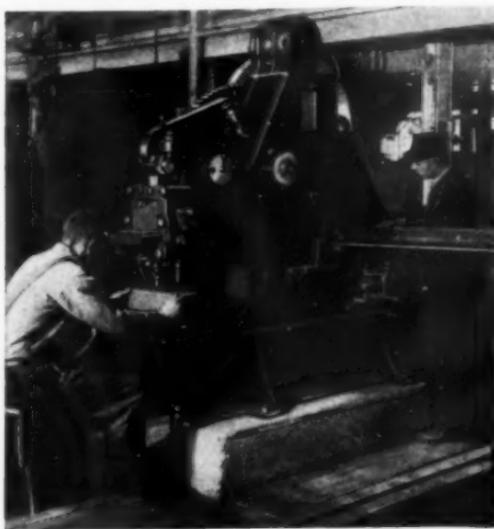
SUNDSTRAND MACHINE TOOL CO.
2535 ELEVENTH ST., ROCKFORD, ILL., U.S.A.

RIGIDMILS - STUB LATHES

3-Wheel Tool Grinders - Centering Machines
Balancing Tools - Bench Centers - Special Machines



**Are You
Still
Doing
Punching
and
Shearing
the "MODEL T" Way ?**



We all admit that the old "Model T" Ford rendered a great service to the motoring public. But it finally outlived its usefulness, was replaced by better, more efficient cars.

Your metal working machinery becomes obsolete and inefficient, too. If you want startling proof, see one of the new Buffalo Universal Iron Workers in action. Watch it handle Angles, Tees, Rounds, Squares, Flats with equal precision and speed.

It does better work in less time and at lower cost. There are sizes for every need. For all the facts, send Quickmail Coupon No. 8 today for Bulletin 331-A.

BUFFALO FORGE COMPANY
161 Mortimer St.

Buffalo, N. Y.

Branch Engineering Offices in Principal Cities
In Canada: Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

**"Buffalo" Punches, Shears
and Bar Cutters**



... Again CHICAGO
Points the Way to
Reduced Costs!

● This new Multiple Automatic Bench Type Riveter permits the operator to move the riveting heads to any desired centers. It is a machine which meets the needs of practically an unlimited number of assemblies.

Manufacturers thus have the opportunity to reap the benefits of multiple setting from a single riveting unit. Speedy, accurate, it has amazed engineers who have seen it in operation. It is the one machine that every designing and production engineer should investigate.

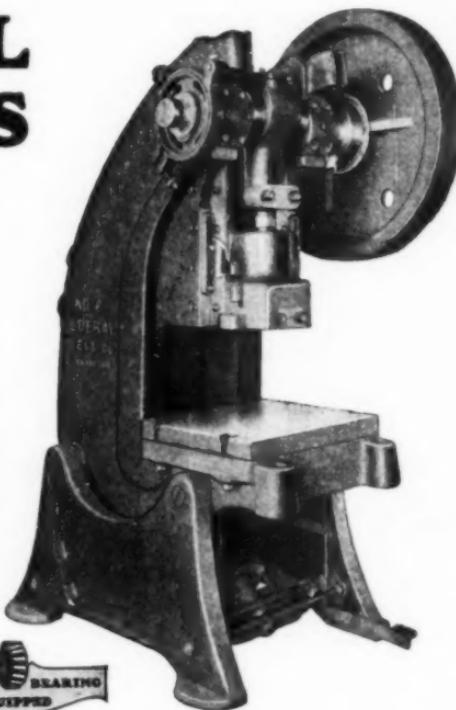
It is suggested that you send blue prints and sample assemblies when you make inquiry. Use Quickmail Coupon No. 56 when you write.

Chicago RIVET & MACHINE CO.
1855 So. 54th Avenue CHICAGO, ILLINOIS
Tubular and Split Rivets in All River Metals

FEDERAL PRESSES

*Increase Production —
Reduce Upkeep —*

Here are two of the many popular models of Federal Presses — sturdy, efficient units for rapid, low cost production. The Timken Roller Bearings in the flywheel are adjustable for wear, eliminating the need for expensive rebuilding and repairs after long use — preventing damage to the clutch and control mechanism. Non-repeat safety type clutch



and tripping device are standard equipment on Federal models, safeguarding against accidents to operators or dies should operator fail to release pedal.

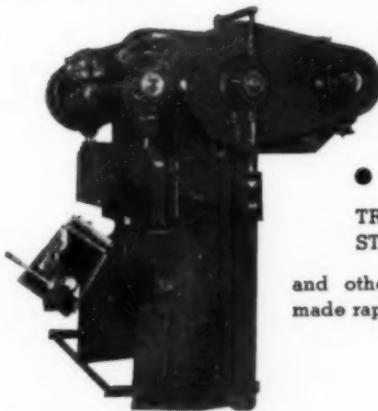
Above is shown Federal No. 7, Flywheel Type with a rated capacity of 79 tons. At the left is shown the No. 3 V-belt drive direct drive model — also available with flat belt or direct geared drive.

Quickmail Coupon No. 68 will bring you illustrated folder showing all the different models and giving full specifications.

FEDERAL PRESS CO.
ELKHART, IND.

Announcing

Verson JUNIOR PRESS BRAKES
with
SWING-AWAY BEDS



(showing bed in open position)

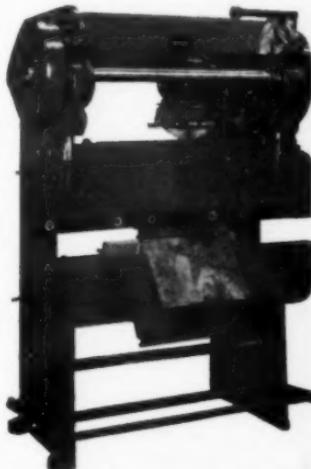
- **They are MULTI - PURPOSE MACHINES**

In addition to special work, these machines may also be used for regular press brake work such as forming, bending, notching, punching, piercing, etc.

● They may be purchased with one or several beds, all interchangeable, for every conceivable job.

THESE MACHINES ARE AVAILABLE IN 8 SIZES.

DESIGNED AND BUILT BY THE ORIGINATORS OF ALL-STEEL WELDED CONSTRUCTION IN THE MANUFACTURE OF PUNCH PRESSES.



(showing bed in closed position)

Complete Information and Prices Will Be Mailed on Request.

VERSON ALLSTEEL PRESS CO.
9303 S. Kenwood Ave., - - - Chicago, Illinois

PROCUNIER

HIGH SPEED TAPPERS

Designed To Suit

YOUR Job

Your tapping job can be handled more economically and accurately by Procunier high speed tappers because only Procunier has *all* these features:

Dry double-cone friction clutch that won't wear out, and can't absorb oil; practically eliminates tap breakage and makes bottom tapping easy TRU-GRIP Tap Holder, the most practical tap holder that ever held a tap; small, light and accurate Ball Bearings Heat treated, balanced, planetary type gear reversing mechanism that distributes pull among three gears and reduces strain.



Procunier High Speed Tapping Heads are designed to fit your tapping needs. Write for this new folder No. 937 for full information. Use Quickmail Coupon No. 34.

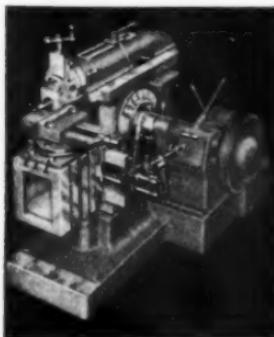


PROCUNIER SAFETY CHUCK Co.
14 SO. CLINTON ST., -:- CHICAGO, ILL.

MEET MODERN PRODUCTION NEEDS WITH

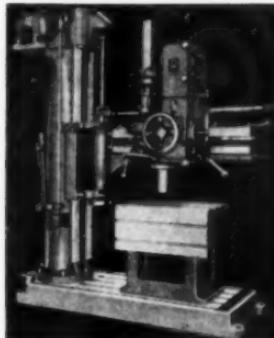


Steptoe Shapers



change speed box—operator merely locates work and pulls down lever until tap engages it—thereafter operation is entirely automatic. Manufactured since 1865, the "GARVIN" name has always been synonymous with production tapping.

Western 12-Speed Radial Drill



STEPTOE SHAPERS—Heavy construction, pressure lubrication and Timken bearings throughout assure rigidity, accuracy, dependability and long life. Centralized controls—instantaneous feed and speed changes may be made with fingertip control while machine is running.

GARVIN No. 2-X AUTOMATIC TAPPING MACHINES—with V-belt motor drive through four

WESTERN 12-SPEED RADIAL DRILL—with 12

geared spindle speeds of from 40 to 2000 r.p.m., this ruggedly-built, easily-controlled drill is equally adaptable for small drilling and tapping jobs as well as heavy duty milling and spot facing operations. Simple, centralized controls, ball bearings throughout, instantaneous speed and feed changes and easy swinging arm assure speed and accuracy.

Garvin No. 2X Automatic Tapper



The Big 4 Western Line embraces Western Radial Drills, Garvin Automatic Tappers, Steptoe Shapers and Chard Lathes. It will pay you well to become better acquainted with these modern production aids.

WESTERN MACHINE TOOL WORKS
HOLLAND, MICHIGAN, U.S.A.

PROOF

SEVERANCE TOOL MFG. COMPANY
EAST DEARBORN AVENUE - LANSING, MICHIGAN



Severance
MIDGET MILLING CUTTERS

March 11, 1938

ATTENTION Mr. Robt. C. Van Kempen, Bus. Mgr.

SEARCH Results from our February Ad.

Hitchcock Publishing Co.,
508 So. Dearborn St.,
Chicago, Ill.

Gentlemen:

We have just checked over the returns from our first full page ad carried in your enlarged February issue of HITCHCOCK MACHINE TOOL BLUE BOOK.

We are greatly pleased with the results from this advertising. It has resulted in the largest number of inquiries that we have received from any advertising thus far. The quality of inquiries are excellent and has already resulted in several orders. The number of foreign inquiries also has pleased us.

We regret that circumstances prevented our being in the March issue with an ad, but are enclosing herewith a copy for 1/2 page in your April issue.

Sincerely yours,

SEVERANCE TOOL MFG. CO.

R. W. Severance
R. W. Severance

RWS:vw
Enc.

Here's



Here's

CCA

26,000 MONTHLY CIRCULATION—the cream of the Machine Tool Field — reaching important key men in industry, large scale buyers and users of tool equipment and allied products.

THAT BLUE BOOK ADS PRODUCE RESULTS

How



Why—

Modern Collet & Machine Co.

401 Salliotte St.

ECORSE

MICHIGAN



March 16, 1938.

Hitchcock's Machine Tool Blue Book
508 So. Dearborn St.,
Chicago, Ill.

Attention Mr. R. C. Van Kampen

Gentlemen:

During the past fifteen years we have used advertising space in every publication in the machinery and tool field. While our advertising in some of these magazines has been of the nature of infrequent "one time shots" we have had several continuous trade paper schedules — one of which has been in Hitchcock's Blue Book.

Our inquiries from your publication have been averaging between thirty and forty each month which is approximately twice as many as we have received from any other trade paper. A very satisfactory volume of business has been traced directly to these inquiries.

With results such as these and with the distinct improvement in the general makeup of your magazine in its new size, we will certainly continue to place Hitchcock's Machine Tool Blue Book at the top of our list of publications which we prefer to carry our advertising.

Sincerely yours,

MODERN COLLET & MACHINE CO.,

B. J. Moscow

B. J. Moscow, Sales Manager.

EJM:HL

LOWEST RATES—producing more inquiries and lowest cost sales in Machine Tool Field—most effective coverage at rates fully 25% lower than any other paper of corresponding circulation in this field.

HARNESS Centrifugal Force . . .

Put It
To Work!

That's what CONWAY Clutches actually do. This enemy of Clutch Performance is made to help—by pulling out—and holding out the levers. In that way it aids in releasing the Clutch and prevents drag.



The Conway Clutch, Series 390, Gear Tooth Drive. One of five Conway Heavy Duty Models Described in Catalog L28.

Other reasons for the popularity of CONWAY Clutches are—smooth, easy engagement—instant release—free idling—ample capacity—dependability and durability.

Let us help simplify your Clutch problems—by submitting our recommendations and sending you catalog. Just tell us your requirements. There's a CONWAY Clutch for practically every need. Here are three typical types:

TORQUE In Inch Lbs.	H. P.	BORE	CATALOG
95-975	14 to 12	3/4" to 15/8"	XYZ
400-6300	1 to 116	1 3/16" to 4 1/4"	P20
3350-91,000	13 to 990	2 7/16" to 6"	L28

*Use Quickmail Coupon No. 23 in sending
for the catalogs desired.*

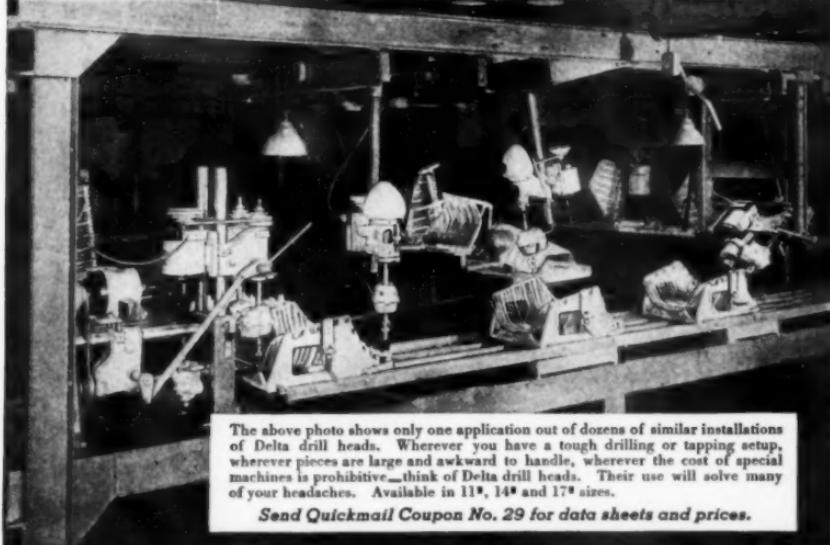
THE CONWAY CLUTCH CO.

1541 Queen City Ave.

-:-

CINCINNATI, OHIO

TOUGH SET-UPS ARE "Duck Soup"



The above photo shows only one application out of dozens of similar installations of Delta drill heads. Wherever you have a tough drilling or tapping setup, wherever pieces are large and awkward to handle, wherever the cost of special machines is prohibitive...think of Delta drill heads. Their use will solve many of your headaches. Available in 11°, 14° and 17° sizes.

Send Quickmail Coupon No. 29 for data sheets and prices.

FOR DELTA DRILL PRESSES AND DRILL HEADS

TAPPING assembling and fastening holes in the die-cast radiator grilles shown in the photo was a tool designers' headache. The pieces are large and awkward to handle, the holes must be drilled at various angles, and roll-over jigs or special machines would have been equally expensive. Note how simply the problem is solved with Delta 14° drill-press heads.

Four holes are tapped in one operation at the first station, one at a slight angle at the second station and one at an extreme angle at the third station. Minimum handling of the work; minimum tool expense; maximum output—these advantages are made possible by the use of Delta drill heads.

DELTA 17-INCH DRILL PRESSES

Delta 17-inch drill presses are cutting production costs in hundreds of progressive production plants. They are low in first cost and economical in upkeep. Delta 17-inch drill press heads can be used in special setups at any angle.



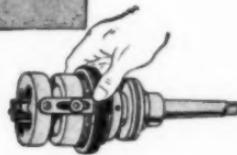
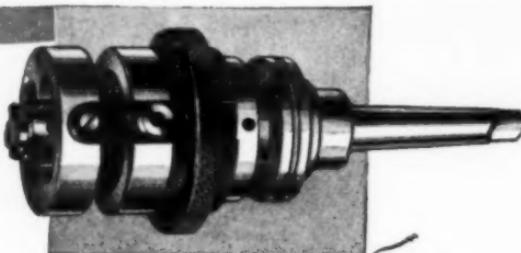
DELTA MFG. COMPANY
695 E. Vienna Ave., Milwaukee, Wis.

**You get
Everything**

that you've wanted
in a Collapsible Tap

Accuracy—Simplicity—and besides—

Instant and Exact Tripping Adjustment



Just turn the knurled ring, for micrometer adjustment of the trip collar.

Quick and exact. Perfect alignment. Far less time needed for set-up; no "cut and try."

Accuracy of pitch and lead, easily meeting your closest tolerances.

Dependability protects the work and the tool—this tap collapses when you want it to.

Strong, rigid construction, with minimum parts. Chasers easily removed for grinding.

Revolving or Stationary—in full range of sizes—and chasers to tap anything from soft brass to forged steel.

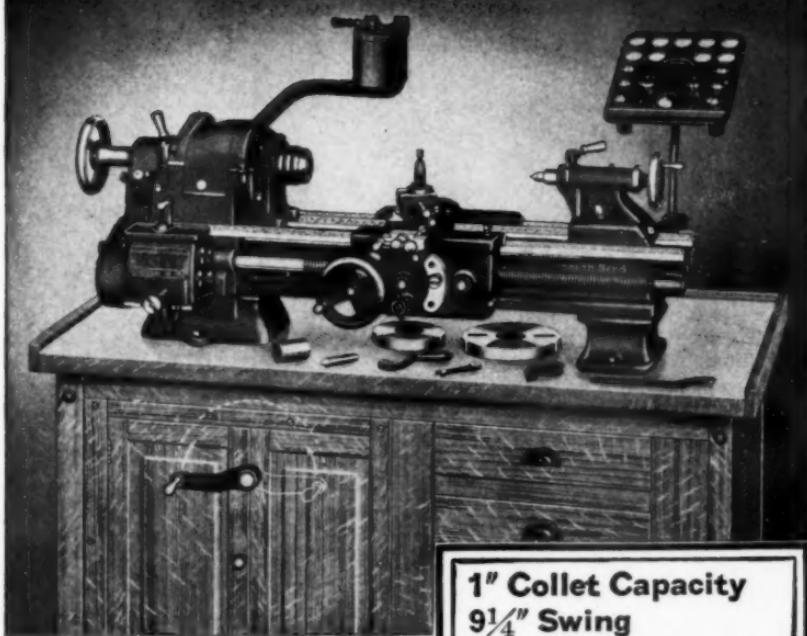
Engineered to your work, like all R-S tools. Carefully fitted to the job, and fully guaranteed as to Accuracy and Economy.

For further information, use Quickmail Coupon No. 58.

The RICKERT-SHAFER Co., Erie, Penna.

Specialists in ACCURATE THREADING at GUARANTEED LOW COST
Die Heads ~ Taps ~ Chasers ~ Boring Heads ~ Threading, Tapping and Cut-Off Machines

New South Bend 1" Collet Lathe



**1" Collet Capacity
 $9\frac{1}{4}$ " Swing
 $1\frac{3}{8}$ " Hole in Spindle
 Priced \$387 and up**

THIS new 9-inch lathe is a back-gearied Screw-Cutting lathe with all engine lathe features, and is recommended for the manufacturing plant and the tool room. Draw-in Collet attachment available in Hand Wheel Type and Quick Acting Lever Type. Six tool bed turret and Double Tool slide adapt lathe to multiple operation manufacturing jobs. Telescopic Screw Type Taper Attachment and other attachments also available.

SOUTH BEND LATHE WORKS
 877 E. Madison Street, South Bend, Ind., U.S.A.

Write FOR NEW CATALOG

Catalog No. 97 illustrates, describes, and prices the new 9-inch South Bend Large Spindle Hole Lathe in Underneath Belt Motor Drive, Pedestal Adjustable Motor Drive, and Countershaft Drive Types, and in 3', 3 $\frac{1}{2}$ ', 4', and 4 $\frac{1}{2}$ ' bed lengths. Copy sent free, postpaid.



SOUTH BEND *Precision* LATHES

Use Quickmail Coupon No. 52 when you write for information.



Send for bulletin

and price list

DRILL JIG
COLONIAL
BUSHINGS

Now

PLUG THREAD GAGES
of **CROBALT**

Send for bulletin and price list.

See coupon No. 55.

300% to 500% LONGER LIFE

DETROIT TAP AND TOOL COMPANY

8432 Butler

DETROIT, MICH.

YOU CAN **EXPECT MORE** FROM A
STANLEY ELECTRIC TOOL

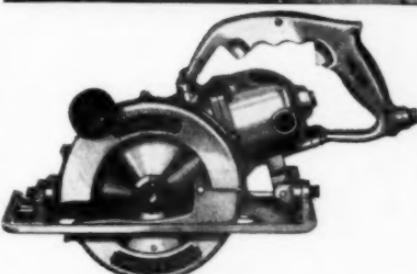
New!
SAFETY SAW
WITH
"DUPLEX" HANDLE!

This new Stanley W-7 Safety Saw is easier to use than any other motor driven saw. The new "Duplex" Handle gives the saw that comfortable "feel or hang" when using one or both hands for crating, building racks — repair and maintenance jobs. Switch conveniently operated from either forward or back grip.

The W-7 Safety Saw is powered and cooled for continuous operation — cuts through $2\frac{3}{4}$ " lumber. Tilting base permits accurate bevel cuts up to 45° through $1\frac{1}{8}$ " material. Depth of cut controlled by wing nut adjustment. Patented safety guard gives positive protection at all times.

**ASK YOUR DISTRIBUTOR FOR
A DEMONSTRATION, OR WRITE
TODAY FOR DESCRIPTIVE
LITERATURE**

STANLEY ELECTRIC TOOL DIVISION, THE STANLEY WORKS, 141 ELM ST., NEW BRITAIN, CONN.



STANLEY ELECTRIC SAWS



COST LESS PER YEAR





The "Unbrako" Products shown above (from left to right) are . . .

"Unbrako" Square Head Set Screw (Fig. 1507) made of extraordinary strong alloy steel. Can be supplied with any style point.

Knurled "Unbrako" Socket Head Cap Screw (Fig. 1434) has the knurled grip head that speeds production and permits easy locking after being countersunk.

(Upper) "Unbrako" Hollow Set Screw (Fig. 232) Strong; points won't mushroom; hex won't round. Made of finest alloy metals.

(Lower) "Unbrako" Self-Locking Hollow Set Screw (Fig. 1564) once it tightened it will never loosen unless a wrench is applied.

Knurled "Unbrako" Socket Head Stripper Bolts (Fig. 1446) has same knurled head that turns easier. Socket head permits more compact designs.

"Unbrako" Wrench-matches the high quality of the screws which with it's used.

INDUSTRY APPROVES!

SOCKET SCREWS

have passed the toughest of all tests—
20 years of being used in all lines of industry.

Naturally, the tests we've made on "Unbrako" Socket Screws, in our own experimental departments prove that they meet our pre-set standards . . . but it is the test of everyday service in practically all types of industry—that is the most conclusive proof of quality and satisfaction that we can offer. Industry did try "Unbrakos" under every working condition, for many and varied purposes . . . saw their exclusive advantages, gave approval by buying more. That's a real assurance of quality from the toughest proving ground of all.

Take the advice of firms everywhere . . . specify and insist upon "Unbrako" Socket Screws. Write for descriptive literature.

STANDARD PRESSED STEEL CO.

BRANCHES

BOSTON
DETROIT
INDIANAPOLIS

JENKINTOWN, PENNA.

Box 559

BRANCHES

CHICAGO
ST. LOUIS
SAN FRANCISCO

WYCO TOOLROOM GRINDER

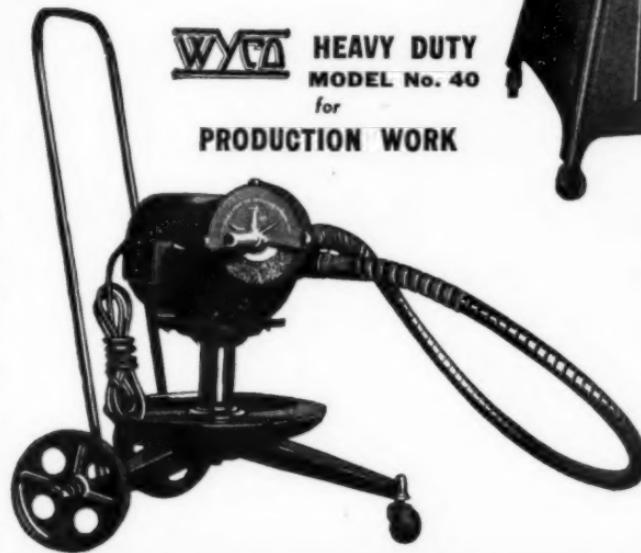
Model No. 20-BH, mounted on cabinet, $\frac{1}{3}$ h. p., 1800 - 3600 - 7200 r. p. m. with wheel arbor and collet hand piece, complete as shown, \$89. Priced separately—Grinder \$77.00.

Cabinet \$12.00.

Other tool room grinders of similar design priced from \$55.00 to \$72.00. Suitable for grinding with small mounted wheels as well as for rotary file work.



WYCO HEAVY DUTY
MODEL No. 40
for
PRODUCTION WORK



Made in various styles and models. Prices range from \$105 to \$200.

Compare Prices!
We Guarantee
QUALITY.

Write or use Quick-mail Coupon No. 19 in sending for the new WYCO Catalog No. 38.

WYZENBEEK & STAFF, INC.

838 W. HUBBARD ST.,

CHICAGO, ILL.

ARMSTRONG



96% of the Machine Shops can't be wrong on ARMSTRONG TOOL HOLDERS

96% of the Machine Shops and Tool Rooms now use ARMSTRONG TOOL HOLDERS—have changed over from innumerable "I-job" forged bar tools with permanent multi-purpose ARMSTRONG Turning Tools, Boring Tools, Cutting-off Tools, etc., etc. This world wide change in shop practice has practically eliminated the forging of bar tools for any of the standard operations on lathes, planers, slotters and shapers, with a resulting saving of "All Forging, 70% Grinding and 90% High Speed Steel." Because ARMSTRONG TOOL HOLDERS embody an efficiency and strength developed thru over 40 years of specialization in cutting tools, the cutting-tool efficiency of any shop is almost directly proportionate to the extent to which that shop applies the ARMSTRONG System. Maximum efficiency—greatest output at lowest cost, can only be had where ARMSTRONG TOOL HOLDERS are used for every operation on every machine tool. 96% of the toolroom foremen can't be wrong, and more of them are using ARMSTRONG TOOL HOLDERS for more operations each year.

If you are not familiar with the complete ARMSTRONG System of Tool Holders for lathes, planers, slotters, shapers, turret lathes and screw machines, write for an ARMSTRONG B-35 catalog today.

Use Quickmail
Coupon No. 6



ARMSTRONG TOOL HOLDERS Are Used in Over 96% of the Machine Shops and Tool Rooms.

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

308 N. Francisco Ave. Chicago, U.S.A.

Eastern Warehouse and Sales:

199 Lafayette St., NEW YORK

SAN FRANCISCO

LONDON

HITCHCOCK'S *Machine Tool* BLUE BOOK

Selected
Circulation

26,000
Monthly

APRIL, 1938

THIRTY-THIRD YEAR

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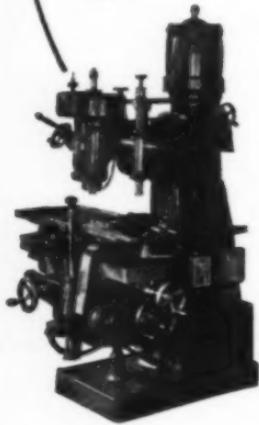
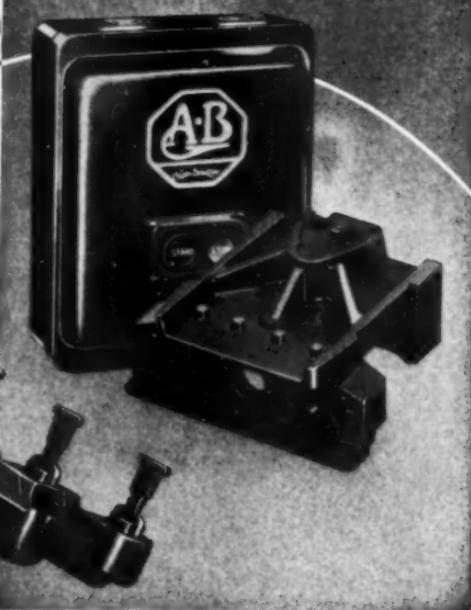
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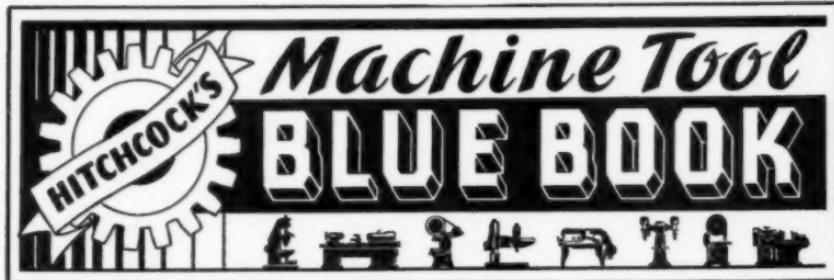
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What About Plastics?

A Glimpse Into Chemistry's Important Contributions
To Industry — *by the Editor*

PLASTICS have entered into our daily lives, to a greater extent than many of us realize, bringing us countless new gadgets, accessories, comforts and conveniences—and a host of old, familiar objects, modernized and streamlined by plastic processes.

Today, many thousands of articles owe their origin, more or less to the magic of modern chemistry—and the end is nowhere in sight. In fact the plastic industry seems to be just commencing to unfold its real possibilities. Developments and changes in processes and materials have been following so rapidly that it is difficult to appreciate all that is taking place in this busy field.

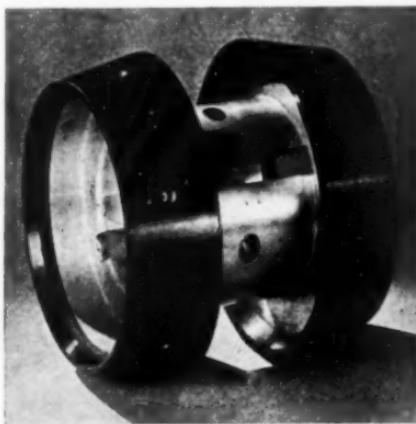
Some time ago, Du Pont offered Pontalite, and now Lucite. Bakelite has recently presented Polystyrene. Other recent innovations have added colors to the ureas and cellulose

acetate—and much progress has been made in injection and transfer molding. All of these have helped to give impetus and the industry is going places. It would be rash indeed to attempt to predict all that the future may hold—to forecast any boundaries

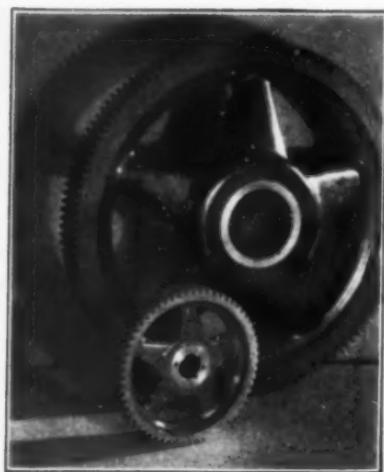
in this amazing new field. Undoubtedly, during the next couple of decades, plastics will exert a profound influence on our daily lives. We have just about arrived at the place where the industrial designer must consider plastics, no matter what kind of job he is undertaking.

But what are plastics and how are they made? How were they developed? Rather elastically, the

term has been applied to products that can be pressed, molded or formed into any desired shape. Industry applies the designation to a broad range of synthetic materials, classified roughly



Textolite Clutch Body Ring Moulded by General Electric for Brown & Sharpe Mfg. Co.



Celeron Spoke Gear Moulded by Diamond Fibre Co., for Studebaker.

by their chemical nature and mode of manufacture or method of handling.

A complete list of the plastic materials available at present would be quite formidable, comprising several hundred chemical compounds. While it is molding compounds that attract our interest, it should be remembered that the resinoids are also used in other forms—as varnishes and lacquers—as binders in the manufacture of safety glass—and in uniting laminated sheets and parts.

Generally, the plastic materials may be grouped into three classifications:

Phenol-formaldehyde resinoids, such as Bakelite, Durez, Resinox, etc.

Urea-formaldehyde resinoids, including Plaskon, Beetle, etc.

Cellulose acetates comprising Tenite, Lumarith, Plastacele, etc.

Molded parts are made from many other substances, such as skinned milk (casein), picric acid derivatives, soy beans, and as recently announced by the Government laboratories, from sawdust.

The different plastic compounds present a wide variation of physical qualities and characteristics, calling for discretion in selecting the best material

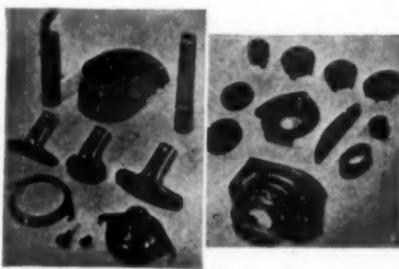
for the job. It is small wonder that plastics appeal to the modern manufacturer for they offer—high electrical insulating values—attractive appearance—light weight—almost any desired color—a surface that's pleasant to the touch—a permanent finish that remains clean and bright—simplification of manufacturing and finishing operations—rapid production—novelty and streamlined sales appeal.

Most of us are familiar with the small plastic radio cabinets, desk sets, ash trays, automobile steering wheels, distributor housings, dash gadgets—and complete molded dash assemblies are on the way.

The latest model Hoover vacuum cleaner features plastic parts, ranging from the motor housing and hood to cleaning tools. Some of these phenolic plastic parts are structural members subjected to hard usage, vibration and knocks. In such applications, compensation must be made in the design for the fact that the plastics are not so rugged as the metals displaced. That is where the experience and skill of the plastic designer are tested.

Weight of the new vacuum cleaner has been reduced several pounds—the plastic parts help to hush motor noise—sales appeal has been added and manufacturing costs reduced—surely sound reasons for the changes.

Typical of other modern applications of plastics to machine parts is the Textolite clutch body ring illustrated. In this particular instance, the use of plastics not only effected manufacturing economies, but the particular grade



Bakelite Parts for the New Hoover Vacuum Cleaner.



Plastic finishing operations in the General Electric, Pittsfield Plant.

of Textolite used is said to have a higher ratio of friction than other materials formerly used, and consequently gives longer operating service. This particular item was molded by General Electric Co., for the Brown & Sharpe Mfg. Co.

The Celeron spoke gear shown represents an advanced step in the evolution of non-metallic gears for subduing noise in the timing mechanisms of high speed motors. Celeron is said to be well suited for this service because of its strength, light weight, low cost, and resistance to water, oil and chemicals. Resonance was eliminated by reducing the area of the vibrating components of the gear, and the noise volume was reduced materially. This particular job was molded by Continental Diamond Fibre Co., for the Studebaker Motor Corp.

Both photos were supplied through the courtesy of "Modern Plastics".

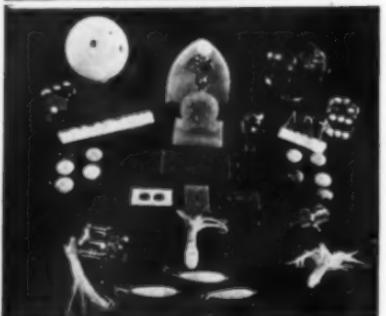
Some idea of the activity in the plastics field may be gained from the fact that the Pittsfield plant of the General Electric Co., has 324 presses set up — asserted to be the largest number of presses operated by any single molder in the country. Approximately 300 additional presses are operated at the G-E Meriden and Fort Wayne plants. Equipment at the Pittsfield plant is extremely flexible with a range of $7\frac{1}{2}$ to 1500 tons pressure available. Heat is provided through hot water under high pressure by means of a Supertherm system, at

a pressure of 190 lbs. per sq. in., and a temperature of 370° F.

The development of plastics has been rather romantic. The first commercial plastic — celluloid — was an accidental discovery on the part of a country newspaper editor who dabbled in chemistry. Many subsequent developments have been lucky accidents.

In quest of an ivory substitute, some 65 years ago, John Wesley Hyatt stumbled on the formula for celluloid. Many uses were soon found for the new material, including the resplendent celluloid collars and cuffs—but there was one serious handicap—inflammability. In spite of the fire hazard, celluloid was used in tremendous quantities, in many applications other than photography.

The next important step in the succession of plastic developments came about 1907. The electrical industry wanted a better insulating medium, and searching for this, Dr. Leo Baekeland developed the formula for cast phenolic resin—Bakelite. Dr. Baekeland was attracted to artificial phenolic resin because he suspected a way might be found to mold it into an infusible form. It had been known that phenol (carbolic acid derivative of coal) and formaldehyde (a gaseous derivative of wood alcohol), mixed together with a catalyst would produce a fluffy, unworkable resinous substance. It remained for Dr. Baekeland to apply heat and pressure and produce a new compound that was radically different



Catalin operations and products.

from resin. Natural resins are softened by heat and hardened by cooling. Dr. Baekeland's new material hardened permanently when he heated it and could never again be softened.

Further, Dr. Baekeland discovered that new properties could be gained by altering the compound in various ways. A woodflour filler gave it strength and overcame brittleness, and other fillers could be used. Varying the catalyst made other changes possible.

Bakelite answered all the needs of the electrical industry. The automotive manufacturers soon found that Bakelite was what they had been seeking for electrical parts. During the world conflict, plastics became a war industry. Then radio developed into an important customer.

Another plastic development was a by-product of the World War. Cut off by the allied blockade from sorely needed supplies of rubber, German chemists worked unceasingly to develop a synthetic substitute. They were unsuccessful in creating rubber from phenol and formaldehyde but they did discover Catalin—a plastic bearing some relationship in point of origin to Bakelite, and capable of being produced in an amazing array of tints and colors. The Germans had too many other worries to bother much with Catalin, so the process was purchased by Americans.

Catalin has been widely used for buttons, costume jewelry, handles, electrical fixtures, ash trays and many household items. Recently, Catalin has been used as the adhesive in laminating furniture veneers.

Machined as easily as wood or soft metals, and with the same tools and technique, it is small wonder that Catalin has found favor with home-crafters—those industrious fellows who spend spare time making this and that.

Catalin should not be confused with the molded resins. It is cast by the maker and delivered to the users in the form of rods, tubes, sheets or special shapes. It is available in almost any color, as well as colorless (water white) clear crystal.



Catalin Fabricating and Finishing Operations.

In the manufacture of Catalin, the phenol and formaldehyde are cooked in huge nickel-lined kettles until of the consistency and color of honey. Each kettle has a capacity of 3000 lbs. Color is added, the bottoms of the kettles are tapped, the Catalin is drawn off in ladles and poured into lead molds. At this point, the material must be handled quickly as it hardens rapidly. Brittleness is prevented by placing the molds in ovens where the hardening is retarded.

Molds of many diversified shapes and sizes are formed by dipping steel arbors (patterns of the forms to be molded) into molten lead. The lead is removed by stripping and forms the mold. The particular mold illustrated will form 12 Catalin rods, 20-inches long and $\frac{3}{4}$ -in. in diameter. The lead molds are used just once as the Catalin is driven from them with pneumatic hammers.

Sheets are usually cast between glass panes, but when special thicknesses are required on small production jobs, they are sliced from partially cured blocks. In this state, Catalin is much like the material the German chemists wanted it to be—synthetic rubber. After slicing, the sheets are returned to the oven until completion of the curing.

There are few hard and fast rules governing the machining of Catalin. In general it may be said that high speeds and light cuts are preferable. With the exception of certain cut-off operations, nearly all work is done dry. Coolants of the non-alkaline type can be employed but are rarely needed.

Spindle speeds in facing and other turning operations vary from 450 to

6000 r.p.m., depending on the jobs. For small holes, drill speeds of from 2800 to 12,000 r.p.m. are commonly used. Carving is done with rotary steel cutters, averaging an inch in diameter and turning at about 6000 r.p.m.

Where limited quantities of special shapes are required, these are often jig-sawed from sheet stock.

Polishing is usually done by tumbling. Lathes and automatic screw machines have been adapted for turning and facing operations, and ingenious indexing equipment is used for multiple drilling. Ball grinding machines are used for making beads, and the cutting is done by grooved abrasive stones.

Photos of the various Catalin processes were supplied by the American Catalin Corp., One Park Ave., New York, who will be glad to furnish any additional information pertaining to their product.

Another important plastic classification includes the acetates, of which Tenite is representative. The chief distinction between them and the phenolic or urea resinoids is that while the acetates are thermoplastic, the resinoids are thermosetting. A certain temperature and pressure causes the resins to harden permanently. This is explained by polymerization or regrouping of the molecules, altering the character of the material but not the chemical makeup.

There is no polymerization in the molding of cellulose acetate, which remains permanently plastic. Like a natural resin, it may be worked over indefinitely. As a result, its heat resistance is lower than that of the

ureas and phenolics. However, this is an advantage in injection molding. Tenite and other acetates can be squirted hot into multiple-cavity molds, in which the material sets rapidly. Heating the material outside the mold saves time and process is rapid because largely automatic, while compression molding involves hand operations. The temperature range in injection molding is comparatively narrow. The injection must be rapid or hardening will start before the mold is filled, and defects will develop. Large pieces are difficult to handle by injection molding, and are usually done by the compression process. New presses providing greater pressures have extended the field of molding and now larger pieces can be handled satisfactorily. Preforming has speeded-up compression molding, and automatic and semi-automatic presses are being perfected.

More and more, industry seems bound to depend on the plastic arts and future developments are sure to be interesting.



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The manager of this shop says, "We never realized what a profitable investment this Lincoln Welder would be. It does most jobs in half the usual time. It is much easier to operate on all kinds of work—plain steel plate, cold rolled steel, tool steel, axle steel, bronze

bushings and aluminum parts. Now we weld successfully practically every metal and alloy. Naturally, Lincoln electrodes help us too. By cutting our costs 25% to 66%, this Lincoln outfit will pay for itself in a short time."

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Comments From The Editor

Reports from Detroit would seem to point to an early opening-up of machine tool business. In part, this view is attributable to arrival of the long-delayed buying season in connection with the 1939 automobile models. There were comparatively few radical changes in models for the present year and new features and new sales appeal undoubtedly will be built into the 1939 cars. There should be equipment purchases for improved efficiency, and in some cases, increased capacity. Anyway, it looks as though capital goods manufacturers should enjoy quite a profitable flow of trade during the next few months.

A major factor that should help make 1938 a really good machine tool year in Detroit would be releasing of the big plant capacity expansion program at the Ford River Rouge works. Also, start of the big buying program of General Motors, reputed to be one of the largest in that company's history. General Motors plants have already released some machinery buying orders, but large scale buying is still several weeks in the future.

Even if all these things do not come to pass, it looks as though 1938 should develop into a better year than was anticipated a short while back. In the meantime, foreign orders for American tools and machinery are helping to boost the total.

"Step on it" . . .

What does a good driver do when he meets a grade and the speed of his car commences to slacken? He just steps a little harder on the accelerator,

gives her more gas and flies over the top.

What do some business men do when they meet the hills of depression? Shut off power and complain because they're left in the valley.

Some of the baseball stars turn in their best games when everything seems against them. They never admit they're licked. Handicaps spur them on to greater effort.

In business, the difference between the highest peaks and the deepest depressions is comparatively but a few percent. That represents the spread between good and poor business.

Consider a hundred concerns in similar lines, admittedly affected by the same causes. There may be a general impression that business is bad. Probably one-fourth will show some increase over previous sales. Maybe half will show a falling-off equivalent to the average decline. The remaining quarter perhaps will be getting enough less than the average to equal the sales increase of the 25 who are progressing.

Often individual concerns may decide into which class they will rise or fall.

The average business doesn't run on all cylinders all the time. The time to get those other cylinders into action is when there are business hills to scale—obstacles, handicaps and reverses to conquer. Competition develops the most valuable qualities in men and business.

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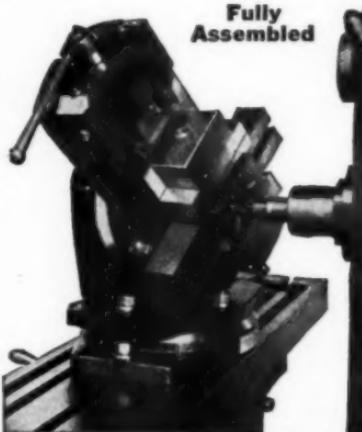
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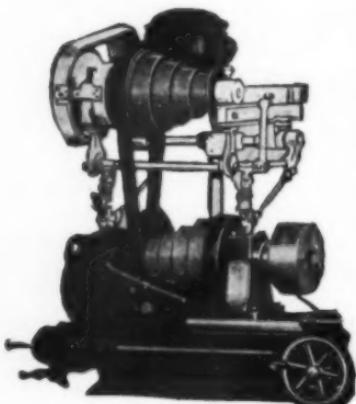
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WHAT'S NEW in the industry



by Wesley G. Paulson, *Editor*

High Production Cone Gear Generators

Michigan Tool Co., 7171 E. McNichols Road, Detroit, Mich., announce a line of automatic gear generators for mass production of cone gearing.

These new units also may be used for cutting other types of gearing.

In finishing cone worm gearing, both worms and wheels are machined with the generating cutter and work at exact operating center distances. To achieve this, the machining of worms or wheels (with mating generating cutters) is actually in two steps.

In the first or roughing operation, a narrow blade generating cutter (or hob) is fed into the blank until the required center distance relation is reached.

In the finishing operation, there is a differential rotary feed—similar to the taking up of backlash in gearing. In this, the cutter blades shave material off the faces of the worm and wheel teeth until the latter are finish sized. It is pointed out that this action is made possible by the design of the gearing. Teeth are not involute, but are generated of straight lines all tangent to the same base circle about the mating worm or wheel cone gearing and therefore mesh with a pure sliding action, the tooth design being such that oil is carried in and forced through ahead of it by the entering tooth, providing continuous film lubrication.

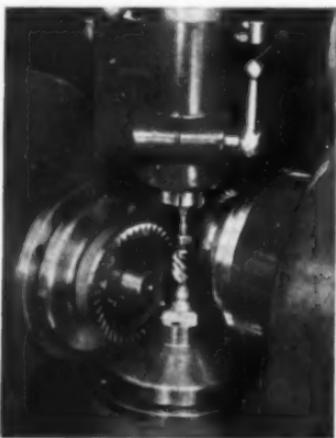
The new machines are designed to take care of gearing up to 4-inch center distance, with wheels up to 7-inches in diameter and worms up to 3-inches. It is stated that these sizes cover virtually the entire range of gears produced in large quantities, since smaller center distances are possible with cone gearing as compared with conventional worms and wheels, as a result of the higher load capacity provided by the large area contact. (Roughly, cone gears are rated at four times the mechanical, and twice the thermal rating of standard A.G.M.A. worm gearing.)



In operation of the gear generator, the part is dropped into the work spindle, the air chuck is thrown off,

and the master starting button pressed.

The infeed cam feeds the cutter heads into the work at the proper infeed speed. If two machines are to be used for roughing and finishing, the roughing unit is not provided with a side feed (rotary feed) cam. The cutters in such a cam are designed to produce the desired width



of gash in the work, to permit entry of the finishing cutter to correct center distance.

On completion of the infeed cycle, there is a short dwell, then a rapid return to loading position, the limit switch stopping unit for reloading.

For independent finishing, a rapid infeed is provided that brings both cutter spindles to the correct center distance. The side feed mechanism then imparts an angular rotation to the cutters. The two helical gears operating the cutter spindles are driven by another helical gear moved along its axis by a drum type feed cam, imparting an angular rotation to the cutter shafts proportional to the helix angle of the drive gear.

At the end of the side feeding cycle, the cam rapidly returns to its original position. Then the infeed cam backs the heads out of the work without interference with the gear teeth.

While specialized in character, it is emphasized that the machine is quite flexible, since quick change gears for the cam drive readily vary the rate of infeed and side-feed, and pick-off gears vary the machine ratio.

Machines for worms and wheels operate identically, hobs being substituted for cutters on cutter spindles, and worms on the work spindle instead of gears.

Work spindle is permanently located in the bed of the machine. Hardened and ground ways are provided for the cutter spindle gears. Work and cutter spindle heads are all cone worm gear driven. Spindles are designed to run concentric within .0001 in., being mounted in super-precision pre-loaded bearings.

Cutter drive shafts, connected with the main driving mechanism through sliding 10-spline couplings, are provided with micrometer adjustments for aligning the work spindles.

Infeed and rotary feed mechanisms (for roughing and finishing respectively) are operated by an independent $\frac{1}{2}$ -h.p. motor. An interlock prevents actuating the feeds unless work and tool spindles are rotating. Cycle is adjustable through pick-off gears from 45-seconds to 5-minutes.

A central system provides automatic lubrication. Tailstocks are of the quick-acting cam type. Work is held in the spindle by a spring set collet chuck, released by a double-acting air cylinder. A shield on the air chuck lever prevents pushing the starting button while air chuck is released. There is a secondary starting button allowing the operator to rotate the work and tool spindles without cycling the feed mechanisms.

The illustration shows cutting of a 1 to 4.875 step-up cone gear. Note that cutter blades are narrower than the space between the teeth, and that they are straight-sided.

Address the makers on your letter-head for any further information desired—and please mention The BLUE BOOK.



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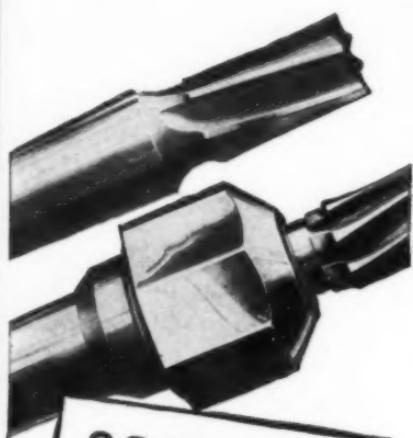
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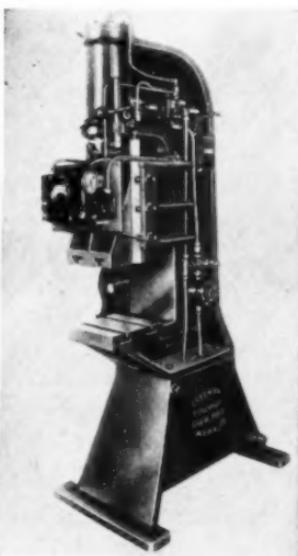
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Greenerd 61-ND-E 15-Ton Press

Intended for light plastic molding or forming, this new press is equipped with automatic electric time cycle and ram control.

The frame is cast of hydraulic semi-steel, and the steel piston has six rings. Ram is heat treated and ground, packed with chevron type packing. The gland is bled back to the tank, taking care of any seepage.

The hydraulic pump is mounted opposite a 5-h.p. motor. Pump is connected directly to a 20-gallon oil sump in base. Attached to bottom of ram is a platen or gate, guided by two steel ways, adjustable for wear.



Control panel is on front of press, with stop-start-jog station, process timer direct reading pressure gauge, and emergency stop station.

An electrically operated valve puts the ram into motion. A push button controls the valve and it is equipped with a timing device that may be set to release automatically and return the

UNIVERSAL
Engineering Company
Frankenmuth, Mich.

platen to the power stop after any interval from $\frac{1}{4}$ to 6-minutes.

Ram has a maximum up pull of 13-tons. Pressure may be set on the down stroke from $\frac{1}{2}$ to 15-tons. The amount of pull on the up stroke is approximately $\frac{2}{3}$ of the pressure on the down stroke.

A hand control is provided for setting up or testing. This is automatically disconnected when electrical control is on. The time control is wired so that if the start switch should be held accidentally while the ram is in cycle, the cycle will continue for the length of time the lag is set, return to the up position, and will not repeat the cycle until button is released and again pushed. This is merely a safety feature.

Dimensions:—ram diameter, 2-7/16-inches; bottom of crosshead or platen, 12x12-inches, with two tee slots for mounting fixture; working table 12x12-inches, with two tee slots for mounting molds or fixtures; distance from center of ram to back of throat, 9 $\frac{1}{2}$ -inches; distance from back of crosshead to

throat 3 $\frac{1}{2}$ -inches; length of steel ways 15-inches; distance from guided head to working table when head is at highest position, 12-inches; stroke of ram, 6-inches; speed of ram down, no load, 59-inches per minute; speed of ram down, 15-ton load, 55-inches per minute.

A similar machine is also made with a maximum capacity of 75-tons.

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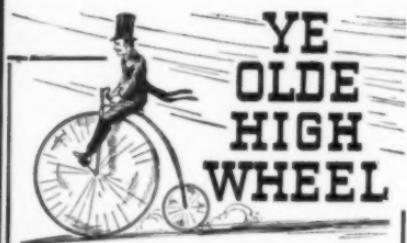
Lubricating Devices

Representative examples of the complete ESSEX Line of lubricating devices and accessories—for every oiling need. Practical—dependable—economical—their popularity is based on solid performance.

Catalog No. 7, showing our extensive line, mailed on request.

*"We Oil the
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ESSEX BRASS CORP.,
2000 FRANKLIN ST.,
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Not so long ago, the High Wheeler provided the ultimate in rapid transportation. Today though, you'll find the lofty biker only in museums.

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are modern tools—that do time and money-saving jobs—in a quicker, better modern way. ENGINEERED to suit your specific job, the keen edge cutting teeth are ground from the solid after hardening. They cut faster and on harder materials—run true without chatter—do not clog or fill up easily on soft materials.

FULLY EQUIPPED—48 hour grinding and regrinding service for all makes of rotary files and burrs.

Write for beautiful new catalogue containing full particulars of how to order any shape, any size or any pitch desired.

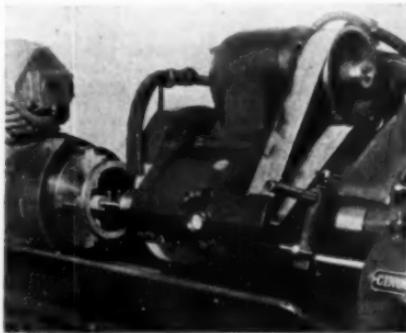
SEVERANCE TOOL MFG. CO.
1510 E. Genesee Ave.
SAGINAW, MICH.



Hinged Motor Driven Internal Grinding Attachment for Cincinnati Universal

A new internal grinding attachment, permanently fixed to the machine and hinged at front of grinding wheel head, has been developed for the Cincinnati 12 and 16-in. universal grinding machines. The attachment is regarded as an important contribution to versatility and rapid, accurate set-ups—essential for the wide variety of grinding operations on a universal machine.

The attachment is rigidly mounted for substantial stock removal and is particularly useful where a considerable amount of internal work must be handled. It may be set-up by merely swinging the spindle housing down and tightening one bolt. It remains in



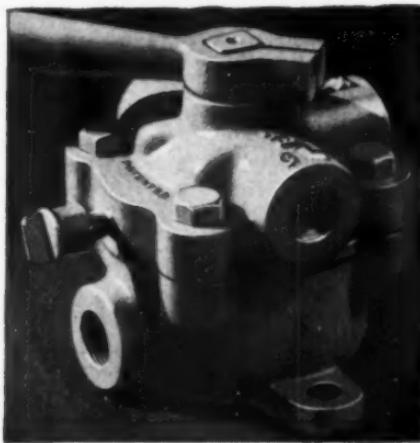
accurate alignment because the swivel setting of the wheel head remains the same for straight external and straight internal work. Some jobs need external and internal grinding and the attachment often permits both operations without removal of work from the chuck. In setting-up, there are no parts to remove or disconnect, and the main grinding wheel may remain stationary or rotate during the internal grinding.

A 2-h.p. individual motor drives the attachment and it is mounted on a cover plate at top of wheel head unit.

Triple Assurance Against AIR WASTE



3 and 4-Way Foot Operated



3 and 4-Way Hand Operated

—with NOPAK Valve

- **Wear Proof**—Patented Disc and Seat design permits continuous operation to actually improve the sealing surfaces.
- **Packless Construction**—Eliminates stem leakage and maintenance.
- **Pressure Sealed**—Line pressure utilized to seal the valve at all times.

These basic features of the exclusive NOPAK design also Protect the Disc and Seat from foreign matter, result in Full Pipe Air Through the Valve at all times, and Permit Quick or Throttling Action as desired. NOPAK Valves for Air, Oil, Water and other Fluids are equally efficient because all embody the same basic principles of design, construction and operation.

Send for Bulletin 65 via
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Galland-Henning Mfg. Co.
2753 S. 31st Street Milwaukee, W.

NOPAK

2, 3 and 4-WAY VALVES



STRIPPITS

For die stripping—
dependable—
economical

Also, WALES individual,
sub-press type hole-punching
and notching dies.

Write for Bulletin A

THE STRIPPIT CORPORATION
1559 Niagara St., Buffalo, N. Y.

RANT RIVETERS

Meet every riveting requirement with noiseless spinning or vibrating hammer types—also vertical and horizontal multiple spindle spinning machines.

LET
US
SHOW
YOU!



You're cordially invited to send unriveted samples for recommendations and quotations—NOW.

**THE GRANT MFG.
& MACHINE CO.**
C. E. Station
BRIDGEPORT, CONN.

Hinged at front of plate, or an adjustable anti-friction bearing hinge, is the internal spindle housing. A single hinged bolt clamps attachment to a machined pad in working position.

An endless flat belt drives the attachment spindle. Belt may be left on pulleys when attachment is swung up out of the way, in which position it is held by a heavy spring.

The attachment has a capacity ranging from $5/16$ to 4-inch diameters, and $1\frac{1}{2}$ to $6\frac{1}{2}$ -inch depths of holes, using $\frac{1}{4}$ to 2-inch diameter wheels. Any of 7 different spindles may be specified. Speeds varying from 10000 to 18000 r.p.m. depend on the spindle selected. Spindle bearings are anti-friction, and adequately lubricated.

The attachment comprises fitted bracket; spindle; quill; 2-wheels of a size depending on choice of quill; pulley; belt; 2-h.p. motor; motor mounting and table type diamond bracket.

A new circular No. G-414 on the Universal grinding machine also covers the attachment. Address the Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, O., and please mention The BLUE BOOK.

Grinding Machinery Service

An expert grinding machine service right in your own plant is announced by the Grinding Machinery Co., 2832 E. Grand Blvd., Detroit, Mich., phone TRinity 2-5455. They make a specialty of motorizing grinders, overhauling and repairing any make of grinding machine, anywhere. Prices on prospective jobs will be quoted on request.

Air-O-cheek
TRADE MARK



Available at popular prices for $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{1}{2}$ and $\frac{5}{8}$ air hose.

See your Jobber—or write—

AIR-WAY PUMP & EQUIPT. CO.
917 W. Jackson Blvd., Chicago, Ill.

The "BEST-BET-YET"...

IN AIR VALVES

... For use in Machine Shops, and for all blowing and cleaning purposes ...

Leakproof. Mechanically efficient.

No buttons, levers or packing glands.

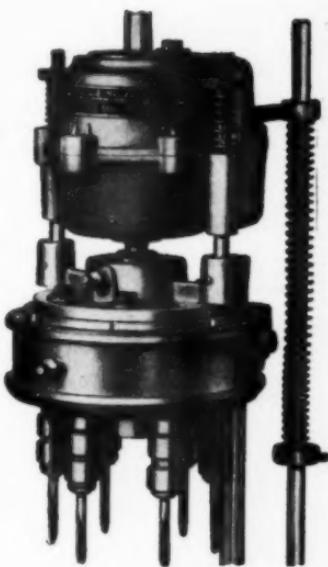
Made of bar-brass and stainless-steel. Operated by slight flex of the hose. Used by leading industrials. Order a sample for test ... and you'll find

"Air-O-Chek" is the best.



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Multiple Tapping Heads
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*The fastest
manual
small tapping
known*



For instance — 2600 single hole pieces per hour or a part with enough holes at 10,000 tapped holes per hour.

Let us have your drawing or sample and most likely we'll give you a new idea of what low cost tapping means.

• • •

ETTCO TOOL CO.

594 Johnson Ave.,

Brooklyn, N. Y.

Eitzen Portable Brinell Meter

Louis C. Eitzen Co., 280 Broadway, New York announces a portable Brinell meter, which simultaneously makes impressions in a reference bar and the material to be tested.

The instrument nests the standard reference bar, which is supported in contact with a standard 10 m/m. steel Brinell ball. When using, the instru-

ment is placed in position on the surface of the material to be tested. The plunger is given a sharp blow with a hammer and the ball produces a simultaneous impression in the bar and in the surface of the material under test. The impression diameters are then compared, and by reference to a direct reading hardness table, the Brinell hardness of the material is quickly determined. By the same token, the tensile strength of the material is quickly computed.

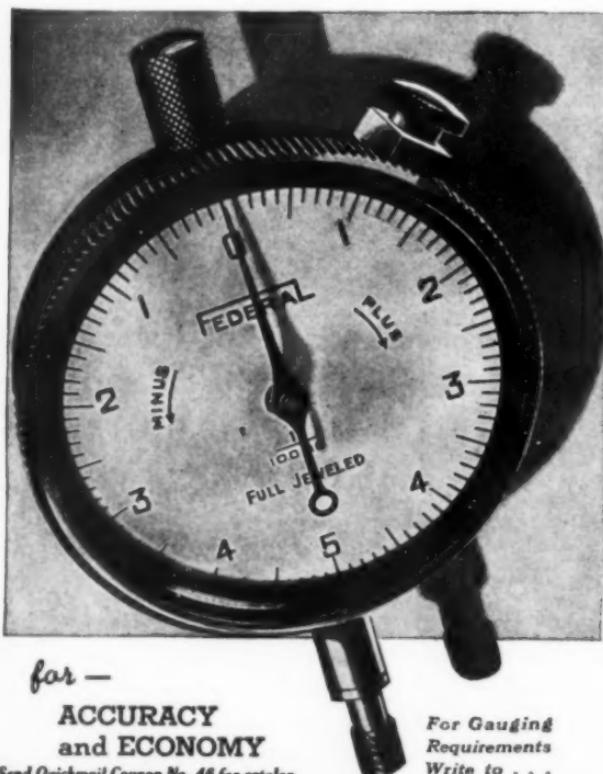
The instrument offers a handy and dependable means of determining the hardness and tensile strength of ferrous and non-ferrous materials, independent of dimensions. Formerly, it was necessary to bring specimens to the laboratory for Brinell tests. Instead, this device may be taken to the job or out in the field. Tests of parts of existing structures and machines can be made speedily, and without dismantling or making any specimens.

The outfit weighs $6\frac{3}{4}$ lbs. and is enclosed in a carrying case $6\frac{1}{2} \times 9\frac{1}{2}$ inches.

Further information may be obtained by addressing the manufacturer and mentioning **The BLUE BOOK**.

Eye Protection Guide

A chart specifying safety goggles to wear for protection against eye



FEDERAL PRODUCTS CORPORATION

1144 EDDY ST. PROVIDENCE, R. I.
Detroit Chicago Milwaukee Cleveland New York Pittsburgh Rochester

hazards in all principal industries has just been completed by the safety engineering division of American Optical Co., Southbridge, Mass. Copies will be sent to all industrial concerns without cost. Eye hazards are classified by industries and specific types of goggles recommended. Please mention The BLUE BOOK in writing for your copy.

Cobalt Thread Plug Gages

Detroit Tap & Tool Co., 8432 Butler St., Detroit, Mich., announce the addition of a line of thread plug gages made of Cobalt, a non-ferrous alloy originally developed for cutting metals. Its high resistance to wear and abrasion has led to adoption recently for numerous parts where elimination of wear is vital. The alloy itself is a cast material consisting basically of cobalt, chromium and tungsten. It may be brazed or welded to steel.

An important advantage of the material for gage work is its low thermal coefficient, reducing temperature

changes in gage size to a minimum. As to wear, it is said that experimental production gages made of this alloy have shown an increase of useful life



up to six times that possible with thread gages of conventional materials.

The new gages are being manufactured in regular production to American gage design standards and will be furnished with aluminum hexagon handles when desired. Cobalt thread gages carried in stock, range from a No. 8 machine screw size up to and including 1½-inch diameter in all listed standard sizes. List prices are said to be only 30-percent above those for standard gages. Special thread plug gages made from this new material are promised on very short notice.

SALIENT FACTS ON CYLINDERS

USES—Power movement in **Conveyors**, in **mounting**—**Rolling Mill**—**Automobile**—**Industrial**—**Working Machinery**—**Driving**—**Indexing Movements**.

SAVINGS—does away with complicated mechanical movements with its **units**, **cases**, **reducing** **units**, **etc.**

FLexIBILITY—Power movement can be supplied from the cylinder's side or from the **bottom**—from **any** **part** of the cylinder.

WHAT TO LOOK FOR—Instead of involving complicated movements, you look for the cylinder's **connecting** **plugs** and **couplings**.

THE T-CMKS. JOHNSON CO.

605 North Michigan Street, Indianapolis, Indiana, U.S.A.
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Universal Adjustable Collet Chuck

Universal Engineering Co., Frankenthal, Mich., offer an adjustable collet chuck that is especially adapted for holding drills and reamers for hand and automatic screw machines.

An important feature is that the chuck can be adjusted to align the tool with the spindle, compensating for any wear in the turret slides. The chucks are provided with keys so the flanges may be set at right angles to

the turret slide, simplifying the correct setting of the tools. Should adjustment be necessary in two directions the keys can be removed. The collets are of the same type as used in Universal collet chucks for holding end mills, Woodruff keyway cutters and



BURKE MILLING MACHINES

Make Fast Work of Small Jobs

Motor
Driven

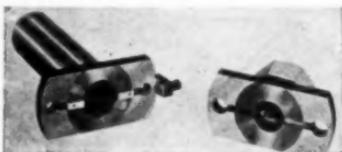
Timken
roller or
ball bear-
ings to
spindle



*Write today for
circulars.*

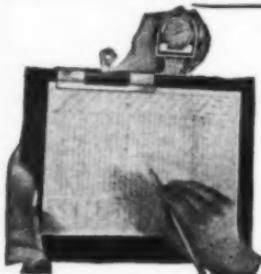
Burke Machine Tool Co.
297 E. 16th St., Conneaut, Ohio

center points. A longitudinal adjustment of the drill itself can be made through the collet and the drill can be set to any length desired. It is said that this chuck will hold the drill even though it is gripped on the flutes. In many instances, it is not necessary to cut off new drills where only short projection of cutting flute is required.



Another attractive feature is that it does not mar the shanks and in this way cause misalignment.

Write direct to the makers for any further information desired, and please mention The BLUE BOOK.



"MEYLAN" NEW TIME STUDY BOARD with STOPWATCH HOLDER attached

Entirely new—made of Bakelite—light weight—will not warp or break—aluminum holder clamps stopwatch tight—convenient arm rest cut-out—wide movable clip for data sheets.

Send for FREE 12 page folder No. 4H fully illustrating and describing this time study board and some 40 types of stopwatches, timing instruments, stopwatch stands, etc. No salesmen will call.

A. R. & J. E. MEYLAN 266-68 West 40th Street
New York, N. Y.
"SPECIALISTS IN TIMING INSTRUMENTS"

FOR SHAPERS

All geared
quick change

No belts to shift

More pull

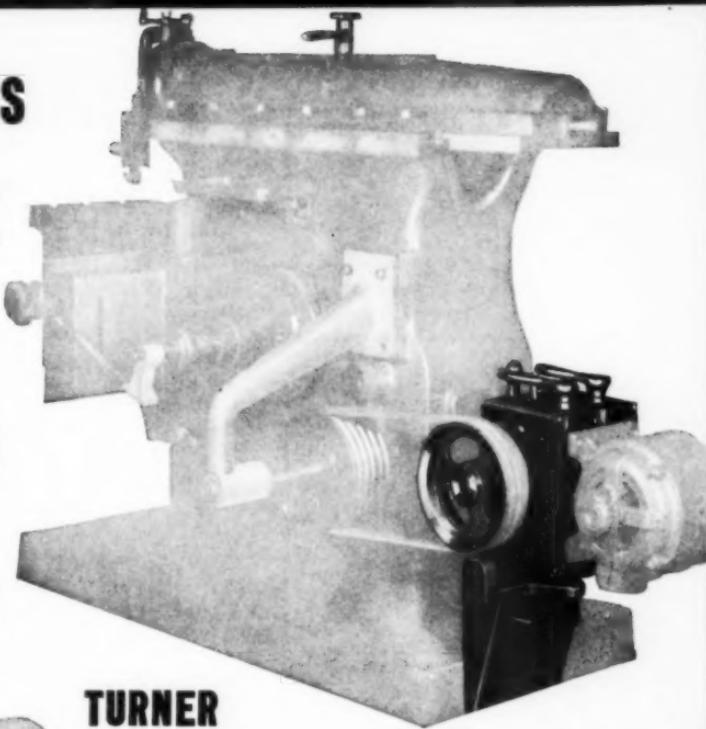
Drives to large
cone at all
speeds

Final drive may
be driven with
V belt if
desired.

More compact

Quiet—all gears
running in oil

Ball bearing



TURNER

UNI-DRIVE

THE MOTORIZING UNIT WITH FOUR-SPEED
SELECTIVE SLIDING GEAR TRANSMISSION

Built in 3 Sizes From 1 H. P. to 10 H. P.

Use also on lathes, milling machines, turret lathes, radial
drills, etc. It is easily adapted to all types of special
machine application.

FULLY GUARANTEED

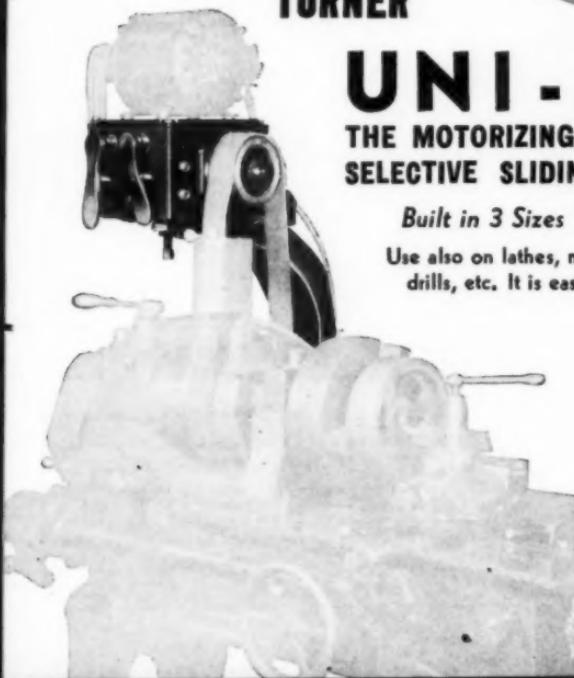
Sold by dealers in most cities.
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Mfg. By

**THE TURNER
UNI-DRIVE CO.**

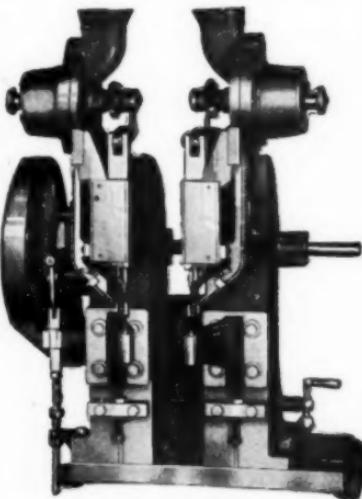
1638 Central St.
KANSAS CITY, MO.



Automatic Multiple Rivet Setter With Adjustable Centers

Chicago Rivet & Machine Co., 1855 So. 54th Ave., Chicago offer an automatic riveter with double riveting heads and an adjustable centering device. One head remains stationary while the other can be adjusted quickly in or out by means of a balcrank and lead screw, requiring but a few

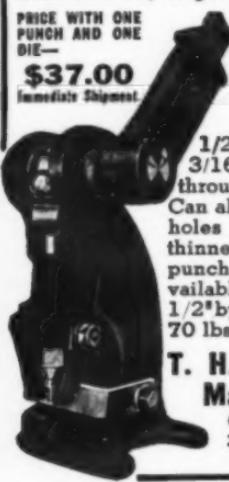
minutes to change from one center to another. A $\frac{1}{4}$ -h.p. motor is employed in the drive and a single clutch operates the plunger, providing uniform rivet insertion and closure, as well as preventing marring of the rivet head or unbalanced tension.



T. H. L. FRONT LEVER BENCH PUNCH

Built for hard, tough work — die cannot lose alignment with punch — all parts interchangeable.

PRICE WITH ONE PUNCH AND ONE DIE—
\$37.00
Immediate Shipment.



Capacity — $\frac{1}{2}$ " holes through $\frac{3}{16}$ " steel; $\frac{13}{32}$ " through $\frac{1}{4}$ " steel. Can also be made for holes up to $\frac{7}{8}$ " in thinner metal. Stock punches and dies available from $\frac{1}{16}$ to $\frac{1}{2}$ " by 64ths. Weight, 70 lbs.

**T. H. Lewthwaite
Machine Co.**
(Est. 1890)
311 E. 47th St.,
NEW YORK

Heads may be operated simultaneously to set two rivets at a time, or the feed may be locked on either head to permit single rivet setting.

Two models are available, one for light and the other for heavy duty work. In operation, they are mounted on a bench and equipped with extension trip rod and floor trip treadle. The latter is jointed and may be moved

COLWELL Tool Post Turrets



increase output and value of every lathe . . . save time and money on repeat operations . . . available for lathes 9 to 18" (16" size shown) economical in first cost . . . easily applied . . . soon pays for itself.

S. G. COLWELL

25 Congress Ave.,

Providence, R. I.

ERRINGTON TAPPING CHUCKS

New York, 200 Broadway; Boston, 830 Old South Bldg.

Chicago, 6316 N. Francisco Ave.

Main Office and Works, Stapleton, Staten Island, N. Y.

Simplest Reverse-Gear; Add Style of Tap Holder required: — Positive. Friction, Quick-Change or Multiple Head; without complication of Fundamental Structure. Most highly Specialized for each job, yet most widely adaptable for future requirements.

Send
Quickmail Coupon
No. 16 for full
information.



Style D-E with Quick-Change Tool Holders to Drill, Tap and Set Studs, etc., without moving work, or stopping or reversing machine. Individual friction adjustments in each tap-holder, if required.

Also, Opening Die-Heads; Opening Stud-Setters; Friction Screw-Drivers and Nut-Setters, etc.

to any convenient position for the operator. Safety and non-repeating type clutch mechanism are incorporated, permitting high speed riveting with safety to the operator.

It is emphasized that the new unit offers greater flexibility in application which opens new opportunities for lower costs among manufacturers of small volume products. Heretofore the economies of automatic multiple rivet setting have been confined to

manufacturers having large scale production. This has required the design of individual riveters to meet the needs of each assembly, and flexibility in riveters has not been a factor. The flexibility of the new unit is said to mean a minimum required investment in riveting machines.

Further information may be obtained by addressing the makers on your letterhead—and please mention The BLUE BOOK.

ELIMINATE SPECIAL AND COSTLY JIG FIXTURES

By Using Yost Drill Press Vises

They are heavily constructed and very compact. Three flanges on the base permit easy attachment to machine or drill press table. A "V" shaped slot milled in the movable jaw permits a positive locking of vertical work. The ease and simplicity in operating makes this tool an indispensable factor in the execution of drill press operations.

Write us for circular "4-H", giving us name of your nearest dealer.

YOST MANUFACTURING COMPANY, Meadville, Pa.



Janette



Type RW4P—a slow speed, right angle shaft, worm and combination worm and planetary gearing type of speed reducer.

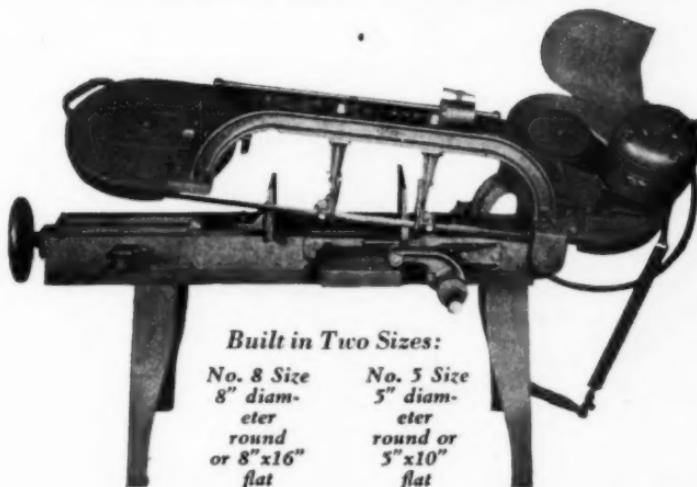
Motorized Speed Reducers
A PRECISION BUILT LINE
OF
16 DIFFERENT TYPES
1/20 to 7-1/2 H. P.

The diversity of the Janette custom-built line of motorized speed reducers enables us to supply a machine for almost any purpose. Let our engineers help in selecting the right type for your application.

ROTARY CONVERTERS — BLOWER WHEELS — MOTOR GENERATORS

Janette Manufacturing Company
556-558 West Monroe Street Chicago, Ill. U. S. A.

Your Stop Watch Will Tell the Story!



Built in Two Sizes:

No. 8 Size
8" diam-
eter
round
or 8"x16"
flat

No. 5 Size
5" diam-
eter
round or
5"x10"
flat

HERE'S a metal cutting saw that combines speed with accuracy. Under competitive tests Wells Band Saws have reduced sawing time from 30% to 50% — have, through accuracy, permitted closer working tolerances, reducing machining time to a minimum.

And that is only two of the Wells features. Design of saw permits cutting material to practically any angle. 3 speed control assures proper saw speed for various types of metals. Portability allows placement at any location in a plant where a metal cutting saw is needed.

Let Wells demonstrate this saw to you in your own plant without obligation.

Send Quickmail Coupon No. 31 for further details.

● *Saw it the WELLS Way* ●

WELLS MFG. CORP.

Three Rivers,
Michigan

Zeiss Precision Instruments

Carl Zeiss, Inc., 485 Fifth Ave., New York announce several new precision measuring instruments. Among these is a large toolmaker's microscope with projector, useful in thread gage inspection and checking taps, dies, hobs, worms, templets and form tools. There is a built-in rotary graduated table with longitudinal travel of six, and traverse travel of two inches and an inclined eyepiece. Magnifications are

10x, 15x, 30x and 50x.

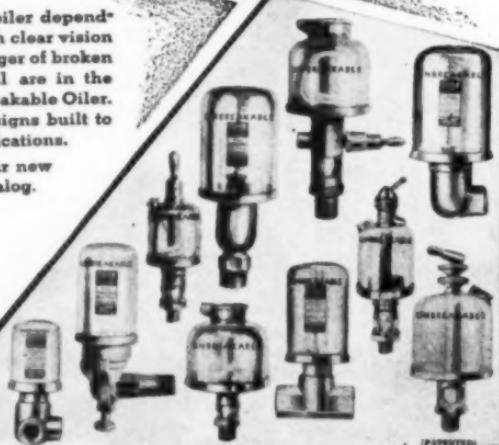
A camshaft tester provides a rapid, high precision means of determining the form and angular relation of the lobes of cams of all kinds. Direct readings may be had on the glass master scale and spiral optical vernier to .00005 in. The master scale may be set to zero or a round figure.

Another useful instrument is the optical circular table for indexing and dividing jobs of every description—especially on large and heavy jig boring.



Complete oiler dependability, with clear vision and no danger of broken glass—all are in the GITS unbreakable Oiler. Special designs built to your specifications.

Send for our new general catalog.



GITS BROS. MFG. CO.

27 years of oil cup experience
1860 South Kilbourn Ave. Chicago, Ill.

Send Quickmail Coupon No. 62 for catalog

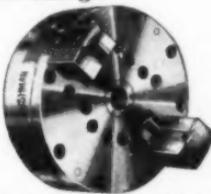
Still another useful item is the improved gear testing machine which furnishes an accurate analysis of gear errors by checking component elements, rather than by showing only the sum total of all errors. This is accomplished by checking the base circle pitch, tooth thickness and concentricity. It is said that the instrument is extremely rigid, and that readings to an accuracy of .00005 in., with perfect repeating are assured. As indicators, two ortho-tests, most sensitive and sturdy feeler gages have been built-in. All kinds of gears are handled—spur, helical, bevel, hypoid and worm—also Fellows' cutters.

These and other instruments may be seen at the New York show rooms and catalogs will be sent if you mention The BLUE BOOK.

A New Cushman Precision 2-Jaw Chuck

The Cushman Chuck Co., Hartford, Conn., offer a new 2-jaw chuck of the precision type, which is claimed to provide a degree of accuracy in centering work pieces not heretofore available, and to incorporate important advantages over chucks of conventional design for production jobs.

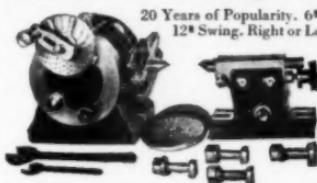
The unusual features include a one-piece steel body with hardened steel face in which the jaws are enclosed. The hardened alloy steel operating screw is held by self-aligning thrust bearings that completely encircle the neck of the screw and assure accurate alignment with the mating teeth of the master jaws. Jaws themselves have wide bearing surfaces in place of the conventional rib design, thus providing locating surfaces of such area that inaccuracy, due to wear, is said to be eliminated. Further, the jaws are supported in the center, under the hardened steel face, to prevent danger of bell-mouthing.



The hardened steel plate enclosing master jaws and the operating mechanism of the chuck is doweled to the body and further fastened by means of socket head screws. There is also introduced, a center pilot bushing which

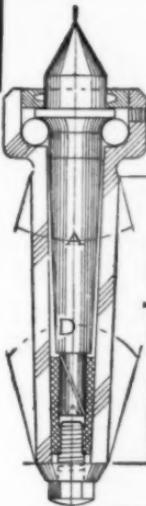
CARROLL Universal Dividing Heads

20 Years of Popularity. 6", 10 $\frac{1}{2}$ ", 12" Swing. Right or Left Hand Type.



WM. CARROLL & SON 1776 Lexington Ave., Cincinnati, Ohio

Rigid Centers Doubly Resilient



THE Ordinary Dead Center is much larger and stronger than the live spindle of the Rigid Center, but will break in service much quicker.

At the Cleveland Machine Tool Show, Sept. 35, we found 5 Lathes idle, having broken their own Dead Centers. We started all, with Rigid Resilient Live Centers, and they are still running.

Rigid Centers are Axially Resilient, due to their Undercut Necks, and Radially so due to the long taper of their Spindle rear-ends.

Rigid Tool Holder Co.
2000 Witherell St.,
Detroit, Michigan

PLUNKET IMPROVED VISES

Made Right—Work Right—Give Satisfaction

Drill Press Vise

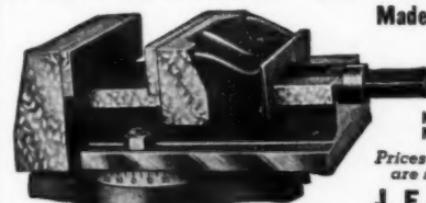
With Extra Lugs for Bolting Down

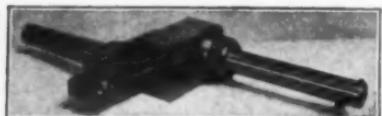
No. 1—8" jaws, 1 $\frac{1}{2}$ " deep, opens 5", wt. 35 lbs. \$23.48

No. 2—10" jaws, 2 $\frac{1}{4}$ " deep, opens 8 $\frac{1}{2}$ ", wt. 90 lbs. \$34.29

Prices are net f. o. b. Chicago. Dealers' inquiries are solicited. Write for illustrated folder today.

J. E. Plunket Machine Co., 1822 W. LAKE ST., CHICAGO, ILL.





Why Not Modernize

your present equipment by using the RUSSELL BORING BAR? Bores holes from 9/16" to 12" dia. with axis of boring bar parallel to axis of the shank, in one compact tool, with micrometer adjustment.

RUSSELL BORING BAR CO.
MIDDLETOWN, OHIO

For Your RIVETING

LINLEY NOISELESS ROTARY RIVET SPINNING MACHINES



Assure Peak Production and Lower Maintenance. Rigid and Powerful. Bench and Floor Types. Motor or Belt Driven. There is a Linley machine for every riveting job.

Send samples of your work for riveting, cost of equipment, and true estimates on production.

**"Built to Last—
Riveting Fast"**

LINLEY BROTHERS CO.
11-A MONTAUK ST., BRIDGEPORT, CONN.

extends through the body and is an effective seal against dirt working into the operating mechanism.

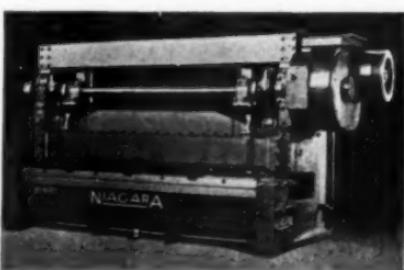
Master jaws are of the American standard design, and the soft top jaws when attached, form a seal on the hardened body face, thus completely enclosing all operating parts of the chuck.

The new chuck is available in a full range of sizes for direct mounting to American standard spindles and may be attached easily to the threaded type of spindle nose by means of an intermediate plate.

Address the makers for copies of new bulletins fully describing these chucks—and please mention The BLUE BOOK.

Niagara KL Power Squaring Shears

The addition of a line of new series KL power squaring shears, built in 6, 8, 10½ and 12-ft. lengths for flat shearing of $\frac{3}{8}$ -in. steel—and 14 and 16-ft. lengths for $\frac{1}{4}$ -in. steel is announced by Niagara Machine & Tool Works, 637 Northland Ave., Buffalo, N. Y. Attractive features of these units in-



clude:—triangular section crossheads with low slope; box section bed; enclosed drive running in oil with gears mounted on anti-friction bearings; 14-point engagement sleeve clutch with built-in single stroke mechanism; self-measuring parallel back gage with ball bearings; and Niagara alloy steel knives. Address the makers for full information, and please mention The BLUE BOOK.

WITTEK AUTOMATIC ROLL FEEDS

For Every Size and Make of Punch Press

INCREASE Production -- Profits



Keep punch presses operating up to capacity—more output, better product, more profit—that's what you can count on with Wittek Automatic Roll Feeds.

They feed automatically, any stock from coils in lengths up to 24" per press stroke—efficient on stock that is difficult to handle, such as paper, fabric, foil or other flexible material which is "floated" through the die. Double roll feed makes it possible to feed cut lengths with one strip following another. The pull feed draws out the scrap while the push feed starts the new length.

Available in single roll, double roll and compound types with straightener—easily installed on any press without alteration.

Wittek offers you savings in operating cost that justify investigation.



WITTEK REEL STANDS

provide easy handling of any kind of coil stock—enable one man to handle and center heavy coils without loss of time—ball bearings assure easy turning and increased output with hand or automatic feeding. Self-centering, balanced at any angle, up to 700 pound capacity. There's a model to suit your exact requirements.

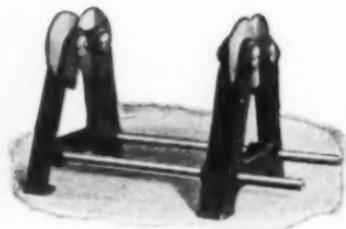


Quickmail Coupon No. 25 will bring your free copy of bulletin "HF" giving complete details and specifications on Wittek Roll Feeds and Reel Stands.

WITTEK MANUFACTURING CO.
4309 W. 24th PLACE, CHICAGO, ILL.

ANDERSON

Improved Balancing Ways



Equip your shop with this accepted method of balancing rotating parts—checking, straightening and truing operations.

Anderson Improved Balancing Ways are simple, sturdy and dependable. They save time, effort and trouble—assure better work.

Four chilled iron discs rotate with minimum friction on sensitive special bearings, giving a prompt, sure indication of whether or not the work is in perfect balance.

Swing	Greatest Distance Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	66 in.	10,000

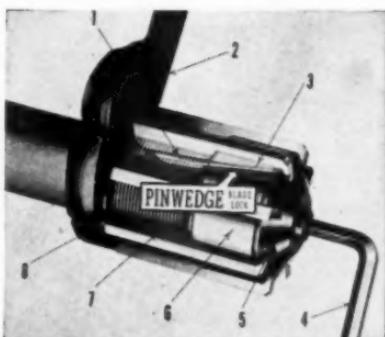
Let us tell you more about this and other useful Anderson equipment. Your request will bring full details promptly.

Anderson Bros. Mfg. Co.
1907 Kishwaukee Street,
ROCKFORD, ILLINOIS

Barber-Colman Masterall Reamer

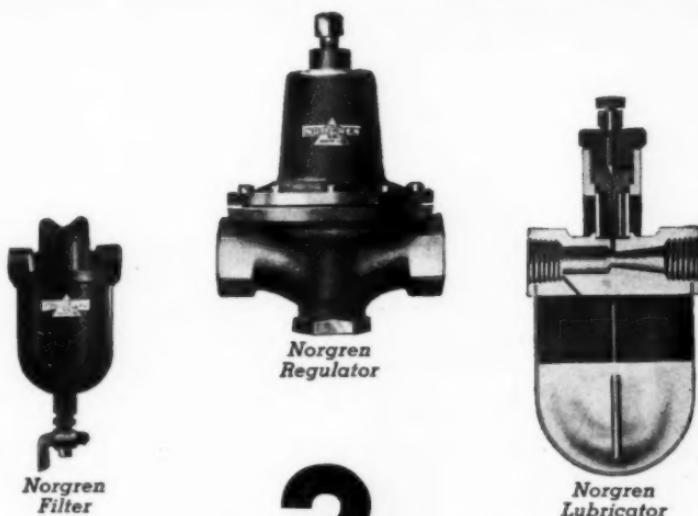
An expansion reamer that may be adjusted by hand, on the machine, either larger or smaller, to accuracy in "tenths" is announced by Barber-Colman Co., Rockford, Ill. Made in both shell and shank types, the new reamers are designated "Masterall".

Blades are Barber-Colman standard, either high speed steel or carbide tipped and fit in slots accurately milled in the hardened alloy steel reamer body. Bottoms of the blades are ground to fit perfectly in bottom of the milled slots in reamer body. Lengthwise movement of the blades produces expansion or contraction of the reamer size.



A specially designed pinwedge blade lock replaces the usual round pin and flat wedge. The pinwedge has round and rectangular legs that when pushed back by a locking plate (tightened by means of a hexagonal set screw) locks blades positively in position. Removing the set screw and locking plate, the threaded screw hole provides a center for sharpening.

An adjusting collar (fitted to the threaded portion of the reamer body) used for pushing the blades forward (for expansion) is also used as a stop when blades are tapped back into the desired position, the diameter being



3 Aids for Air Tools

Smooth, uninterrupted, efficient tool operation requires clean air, at proper pressure, and positive lubrication. These Norgren devices attached to the air line will remove moisture and impurities from the air, will automatically regulate pressure and will introduce to the air stream an oil fog exactly sufficient to lubricate the tool.

Ask for prices on these devices singly or in various required combinations.

C. A. NORGREN CO., Inc.
214 Santa Fe Drive - Denver, Colorado

COMMERCIAL
Centerless Grinding
COMPANY

Contract Centerless Grinding
 Accuracy — Prompt Service

6538 Carnegie Ave., Cleveland, Ohio

GREATER PROFITS



with the

HARTFORD "Super-Spacer"

Speeds-up indexing on long or short runs—eliminates chance of error—indispensable for milling, drilling, slotting, planing, etc.

Write for full information on
 the "Super-Spacer" today.

Hartford Special Machinery Co.
 285 Homestead Ave., Hartford, Conn.

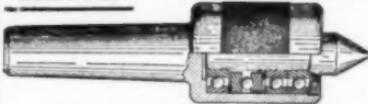


controlled by the movement of the collar which is notched for a spanner wrench.

Fig. 1 in the illustration shows how blades (3) fit in slots of reamer body. 2 is the spanner wrench used to turn adjusting collar. The pinwedge blade lock is shown at 3. The hexagonal wrench used for taking up or loosening locking screw which clamps locking plate in position, is shown at 4. The locking plate mounted on front of reamer body is shown at 5. 6 is the reamer body. Fig. 7 designates the blades which are identical with those used in all Barber-Colman inserted blade reamers. Fig. 8 is the adjusting collar fitted to threaded portion of reamer body, used to push blades forward, or to act as a stop when blades are tapped back into the desired position.

Address the makers for copy of a new bulletin, with large scale illustrations and complete information on B-C reamers. Kindly mention The BLUE BOOK in writing.

"ALIVE" Ball Bearing Centers



"They turn with the work"

Write TODAY — and let us tell you more about them.

MODERN MACHINE CORP.
 323 Berry St., Brooklyn, N. Y.

Why Not Buy The Original Electric Etcher?

MARK IRON AND STEEL
THE ETCHOGRAPH WAY

New ELKONITE TIP pencil.
 New Baby Grand Model at a lower price.

2,000
 in use

WILLIAM BREWSTER & CO., INC.
 42 Church St., New York, N. Y.

HOW DO YOU LIKE THIS
Renu-ED CUTTER?

IT'S A BETTER LOOKING
TOOL THAN MOST
NEW ONES

When you send worn out tools to RENU to be reclaimed, you can rest assured you will get tools back that will not only look right—but will perform right under every working condition.



- A new catalog, outlining this money saving service in detail, is available for the asking. Write

Renu TOOL CO., 275 E. Milwaukee Ave., DETROIT

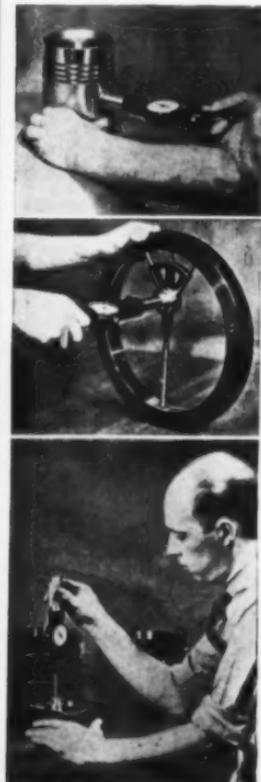
For Your Convenience—Use Quickmail Coupon No. 13 in sending for catalog.

Standard Dial Bore Gages

Accurate measurement of bore diameters is the purpose for which these gages were created—and they are said to meet every requirement with precision and ease of application.

Several outstanding features are incorporated which make these gages applicable to a wide variety of uses, for quantity production or for checking individual pieces.

Each gage has a wide range of adjustment. Only five gages are required to handle the scope of diameters from one to 12½-inches. Diameter extensions are furnished with each gage and setting the gage to any desired size within its range takes but a few minutes. Measurements may be made within ¼-in. from the bottom of blind bores, which makes these gages especially useful in measuring holes that have obstructions such as shoulders, webs, undercuts, etc.



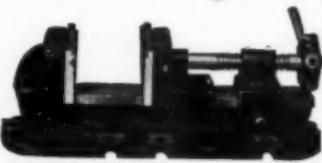
ally centralized in the bore by two independently-operated centralizing plungers, radially located on either side of the measuring plunger. This assures proper centralization of the measuring members and smoother action of the instrument.

The illustrations show the gages in use on typical jobs. All that's necessary is to insert the gage and tilt the handle slightly. The maximum movement of the indicating hand will show the exact diameter. Measurements may be made as rapidly as the gage can be inserted in the bore.

Dial graduations may be had in .001, .0005 or .0001 in., also in 1/100, 1/200, 1/500 or 1/1000 m/m. With the .0001 in. dial graduations it is said to be possible to determine with ease, variations as close as .000025 in.

Standard bore gages are available in four general types. The standard type with short length extension is illustrated. For measuring different

Hold Everything



GEM VISES

Adaptable, time-saving tools on a wide variety of Production, Tool-Room and Maintenance operations. Extra large capacity. Deep jaws. Built to stand up and give long service and complete satisfaction; they soon pay for themselves in time saved.

3 SIZES

3½-inch 6½-Inch 10½-Inch

Booklet describes our entire line

J. E. Martin Tool & Die Works

Established 1912

518 W. State St.,

Springfield, Ohio

depths of bores with this type, all that's required is extensions with plungers of different lengths.

A pistol grip is also obtainable. It was designed for measuring short bores and for use where space is restricted. The dial may be swung to the most convenient angle with respect to the pistol grip.

A regular vertical type, and a vertical 90-degree type complete the line. The former offers a clear view of the

dial when used in a vertical position. The 90-degree type enables the dial to be read from the end of the gage.

A special bulletin is available, giving further information pertaining to bore gages — also the complete Standard Gage catalog presenting 72-pages of useful information on the many different types of dial indicators and precision measuring devices. Address the manufacturers on your letterhead for free copies, and please mention The BLUE BOOK.

SPEED UP
NUT TURNING
WITH THE
FAVORITE
REVERSIBLE RATCHET
WRENCH

Try the "FAVORITE" on a nut that has been tightened by an ordinary wrench and see how many more turns you can take up on it before it is securely seated.

The "FAVORITE" is a time-saver, with its straight-ahead ratchet motion. By throwing pawl, reverse action is instantaneous.

The "FAVORITE" turns two different-sized nuts in each head—one on each end. A distinct saving in number of parts to hold in stock.

Opening clear through head for a free passage of bolt.

Send Quickmail Coupon No. 35 for full particulars.



Greene, Tweed & Co.
109 DUANE ST.,
NEW YORK, N. Y.

*Sole
Manufacturers*

LITTELL

**Air-Blast
Valve
for
Faster
Safer
Production**



PAYS its cost in a few week's time in — increased production — greater safety — economy of air. Automatically ejects pieces. Operator's hands are never in danger zone. Quickly adjustable air nozzle.

Automatic Roll Feeds—

dial feeds, magazine feeds, hopper feeds, for punch presses. Reels for coiled stock. Send for Circulars.

F. J. Littell Machine Co.
4153 RAVENSWOOD AVE., CHICAGO, ILL.

Production 4-Speed Motorization Drive

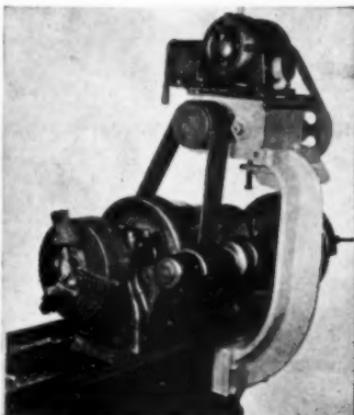
A new type (1136) drive is offered by The Production Equipment Co., 5219 Chester Ave., Cleveland, O., for motorizing machine tools.

A 4-speed quick change gear box is driven by a standard 1800 or 1200 r.p.m. motor mounted on top of box. Pulley on the output shaft drives to a single step on the machine cone pulley or directly to a single pulley. V-belt drive is used between motor and gear box, and a flat belt between gear box and machine pulley. The gears are of hardened steel, operating in oil and sliding on splined shafts mounted on ball bearings.

It is said the new drive solves problems that could not be handled properly by former designs, and often increases the operating range of machines. Belt shifting is not required as speed changes are handled by the gear box. This is an advantage in

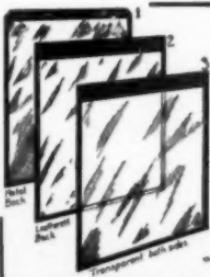
localities where codes require mechanical means for belt shifting.

Various types of supports are available for different requirements, permitting overhead or side mounting of the drive. With two speed motors, wide speed ranges are obtainable.



Also, a special assembly may be furnished, using a single speed motor with the gear box output shaft coupled to the countershaft cone pulley. With this arrangement, a 3-step cone would give 12 different spindle speeds.

Four different types of drives are offered, details of which are given in bulletin 646, which will be sent on request. In writing, please mention The BLUE BOOK.



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Wade Instrument Co.
1663-H E. 118 Street,
Cleveland, Ohio



"As You Like It"

**A Standard
Dial Bore Gage
To Meet Your Requirements**



For checking vertical or deep bores, the vertical or vertical 90° types of Standard Gages fulfill every need. The vertical type, illustrated above, affords a clear view of the dial when used in a vertical position. The vertical 90° type, illustrated in the lower right corner, enables the operator to view the dial from end of gage.

The pistol grip type is intended for use in restricted quarters. The indicator dial may be swung to any position suitable for the operator.

The standard length gage shown below is suitable for the usual variety of bores. For measuring different depths of bores, all that is required is a length extension with plunger.

Standard Dial Bore Gages enable measurements to be made within $\frac{3}{4}$ -inch from the bottom of blind bores, and are applicable to holes with obstructions such as shoulders, webs, undercuts, etc. Only five gages are required to cover diameters from one to $12\frac{1}{2}$ -inches. Two centralizing plungers, one on either side of the live gaging member, automatically keep gaging points true with center line of bore.



"For Better Gaging Come To Standard"

Quickmail Coupon No. 38 will bring your copy of a new illustrated bulletin on Dial Bore Gages.

STANDARD GAGE CO., INC.
POUGHKEEPSIE, **NEW YORK**

Stanley Electric Screw Drivers

Stanley Electric Tool Division, New Britain, Conn., announces two new portable electric screw drivers, Nos. 02 and 02H — powerful production tools for use wherever assembly work is done with screws or nuts.

The advantages claimed for these new tools include light weight, compactness and balance, permitting their use in close-quarter and long reach work. Both screw drivers are avail-

able in four driving speeds, and are equipped with a patented adjustable tension clutch—an exclusive Stanley feature. No. 02 has an enclosed on-





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Circular Knife
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For circular or rotary knives up to 20⁸ diameter. Unusually low price.

Type "CC" Write for bulletin CC.

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205 DUTTON AVE., BUFFALO, N.Y.

BURR KEYSEATERS



Mill keyways in the run or on the ends of shafting already erected—save money on alteration, erection, and repair work.

Made in 4 sizes, for hand or motor operation.

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and-off switch mounted in the rear end bell. No. 02H has an automatic pistol type handle with double pole, trigger type switch.

Address the makers for further information, preferably on your letter-head, and please mention The BLUE BOOK.

PYRO Radiation Pyrometer



STOP spoilage by getting the exact temperature of the work in the furnace—not merely the heat of the furnace. Direct reading; no calculations; no installation; no maintenance expense. Range 1000—3600° F.

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THE PYROMETER INSTRUMENT CO.
102-105 Lafayette St., New York

AN ALL PURPOSE AIR VELOCITY METER

Instantaneous Direct Reading

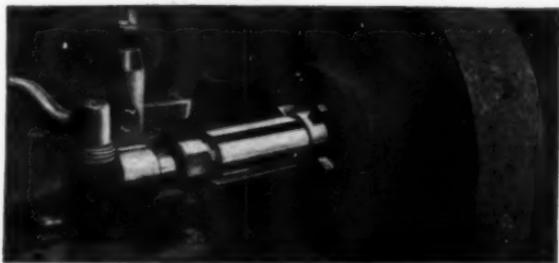


The "Alnor" Velometer removes guesswork as to air speed, direction, drafts, dead spots in heating, ventilating and air conditioning work in the open or in the duct system. Measures total and static pressures as well as velocities.

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NICHOLSON



EXPANDING MANDRELS

act as internal chucks, for use on lathes, grinders, shapers and millers — Big time savers on hurry up and break-down jobs — Eliminate searching for or turning proper size solid mandrel — Fourteen sizes accommodate all bores from $\frac{1}{2}$ " to 7" — Send Quickmail Coupon No. 45 for Bulletin 530.

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are made in two, three and four-way types for air, oil, water, steam, gas, etc., pressures to 5000 lbs. Style E is a general purpose valve

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Various metal combinations to suit any me-

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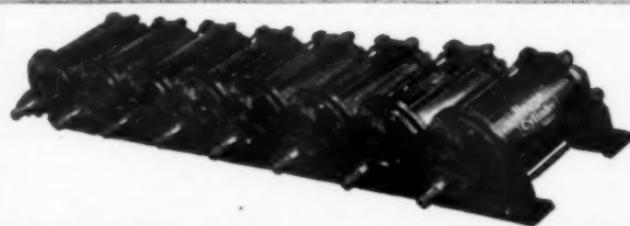


Style E



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POWER MOVEMENT IN ANY DIRECTION



HANNA Cylinders may be mounted vertically, horizontally or in any other position and deliver the same powerful, smooth, positive thrust or pull motion.

Select an operation in your plant involving a pushing, pulling, lifting or lowering motion and compare cost of doing it with a Hanna Cylinder.



TO LEARN PRICE OF CYLINDER SPECIFY FOLLOWING:

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2. Length of stroke.
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Send Quickmail Coupon No. 71 for full information.

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HANNA ENGINEERING WORKS

1763 ELSTON AVENUE

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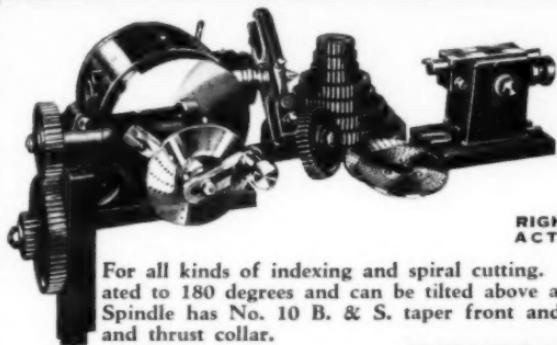
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10 1/2" Full Universal Dividing Head

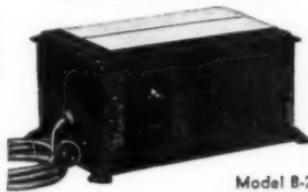
RIGHT OR LEFT HAND
ACTUAL SWING 11" **\$185**

For all kinds of indexing and spiral cutting. Swivel head stock is graduated to 180 degrees and can be tilted above and below the perpendicular. Spindle has No. 10 B. & S. taper front and back with tapered bearing and thrust collar.



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for L-W Magnetic
Chuck \$8.75

NEW, IMPROVED DEMAGNETIZERS



Model B-2

\$65.00

Complete with pilot light, signal, switch and cord. Operates on 110 Volt A. C. Current.

7 1/4" wide, 12 1/2" long, 6 1/4" high.
Shipping weight 35 pounds.



Working Surface 5 3/4" wide, 13" long. Consumes .5 Amp.

L-W MAGNETIC CHUCK

Waterproof for wet or dry grinding
A REAL MAGNETIC CHUCK that is adaptable for any purpose. Unconditionally guaranteed to furnish the highest magnetic holding power on either 110 or 220 volt direct current. Well designed and beautifully finished, highest quality workmanship throughout—complete with \$45

cord and plug—an outstanding value

Also made in the following sizes:

6 1/2" x 18" — \$60 8" x 24" — \$110.00 10 1/4" x 37" — \$195

\$45.00

Complete with switch and cord ready for use. Operates on 110 Volt A. C. Current.

7 1/4" wide, 7 1/4" long, 6 1/4" high. Shipping weight 35 pounds.

Model J-1

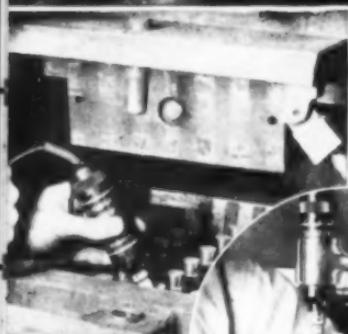
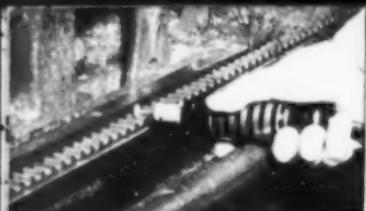
To meet the demand for a Demagnetizer that would properly fill the requirements of taking the magnetism out of work that has become magnetized through induction, we have designed and built two models for large and small work. A single pass over the stationary poles is sufficient to demagnetize the work completely.

L-W also manufactures Power Saws, Lathe Chucks, Milling Machine Vises, etc.
Send Quickmail Coupon No. 36 for a catalog of the complete L-W line.

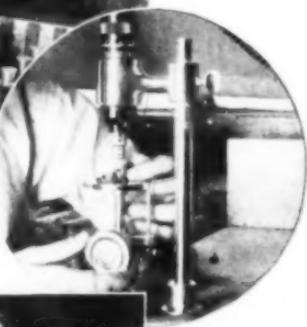
L-W CHUCK CO.

1-7 N. ST. CLAIR ST.,

TOLEDO, OHIO

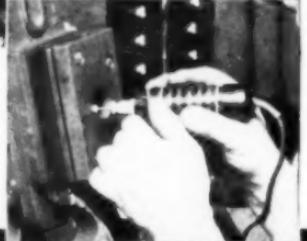


The De Luxe Handee does for itself many jobs over, often on the job.



Reaches those hard-to-get-at places. Its light weight and ease of handling in any position save time on a wide range of operations.

Disposable in die shops and all metal working plants for finishing up and polishing every type of even when set on bases.



HANDEE

A Real "POW" That Fits

• The Handee is the smooth power obtainable. Originally proved until today it is recognized everywhere as the finest, fastest and weight, 12 ounces.

• Actually, A Whole Shop of different accessories, quick change chuck.

• Take it anywhere, plug in 110 volts and you're all set to polish, cut, rout, carve, sand, clean, etc.

• The priceless tool that saves time and money. Indispensable in model and experimental laboratory, on the job line in large or small plants, on all metals, alloys, glass, ceramics, wood, stone, etc. Used to work on delicate mechanical and machine parts without damage.

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OFFEE TOOL OF 1001 USES

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Fits Your Hand

smoothest running handful of controlled
Originated 8 years ago and constantly im-
it is recognized by mechanics and craftsmen
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are all ready to grind, drill,
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Announcing

the New HOBART MULTI-RANGE Arc Welder

Hobart's New Multi-Range Dual Control brings you 1,000 possible combinations of voltage and current. It eliminates all possibility of "dead spots" anywhere within the exceptionally wide welding range of this outstanding new Hobart Multi-Range arc welder.

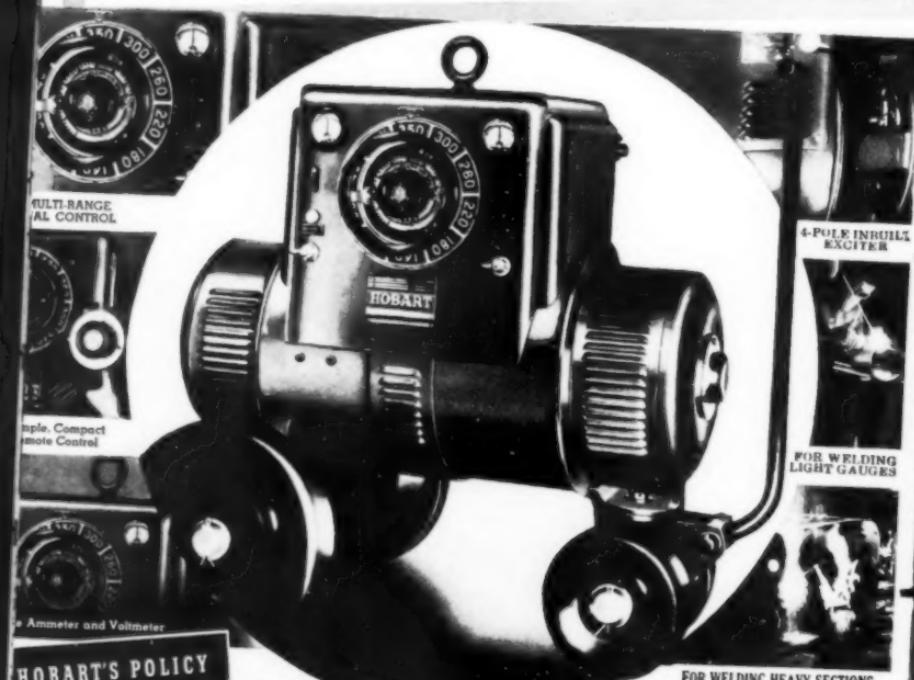
NEW Flexibility! NEW economy! NEW convenience! NEW welding speed! NEW higher quality welds! This NEW type arc welding equipment has been proven by months of practical use in large and small shops that cooperated in trying these revolutionary new weld-

* IMPORTANT IMPROVEMENTS OF SPECIAL INTEREST
TO ALL WHO USE—OR COULD USE—ARC WELDING

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Investigate the many NEW advantages that have been ADDED to Hobart's many exclusive features—at present low prices. Mail the coupon below for NEW printed, colored bulletin giving full details about the many exclusive features in the New Hobart Multi-Range Dual Control Welder. No obligation, of course.

HOBART BROS. CO., Box TB-48 Troy, O.



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This NEW Hobart equipment is offered subject to Hobart's time honored policy of insuring the customer's complete satisfaction through liberal trial and terms!

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If Hobart equipment fails to make good all claims—then—**you are not obligated to keep it.** This is a Standard Hobart Policy
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(kind of work) _____

Use Quickmail
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THE MARSHALLTOWN MIGHTY MIDGET



No. 0 BENCH PRESS

A BETTER BENCH PRESS
FOR
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Heavier construction — greater die space — nickel alloy crank — convertible clutch — improved ball and socket connection — easier adjustment — all combine to make this little giant the ideal press.

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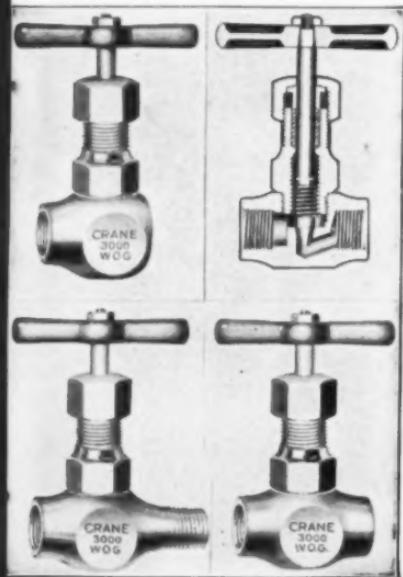
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for catalog.*

MARSHALLTOWN MANUFACTURING CO.
900 East Nevada St.,

Marshalltown, Iowa

Crane Bar Stock Valves

Three new bar stock valves, used in many industries, are announced by Crane Co., 836 S. Michigan Ave., Chicago, Ill. These small 3000 lb. W.O.G. plug type disc, globe and angle valves derive their name from the fact that bodies and bonnets are made from solid bar stock. They are recommended



New Crane bar stock valves.

for connections in orifice meters, regulator leads, bypasses, gauges, for use as expansion valves on ammonia lines

and for many similar purposes where accurate regulation of flow is desired or where parts of measuring instruments must be protected against the sudden release of high pressures.

Exelloy valves are especially suitable for handling oil or gas containing sulphur compounds or for installations where steel valves do not have sufficient resistance to atmospheric corrosion.

The 18-8 alloy valves are recommended for oil or gasoline containing hydrogen sulphide or sulphur dioxide when moisture is apt to be present.

All of these valves may be packed when wide open while under pressure. They are furnished in steel, Exelloy or 18-8 chrome nickel alloy.

The new globe valve No. 222½ is made with male and female ends in sizes $\frac{1}{4}$ to $\frac{3}{4}$ inches inclusive. Sizes $\frac{1}{2}$ and one inch are also being added to the existing Crane line of bar stock valves known as Nos. 222 and 223.

For further information address the makers on your letterhead, and please mention The BLUE BOOK.

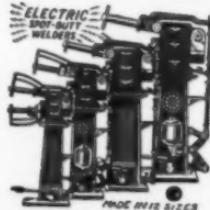
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GEARS IN STOCK— IMMEDIATE DELIVERY

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CHICAGO GEAR WORKS, **764 W. JACKSON BLVD.,**
CHICAGO, ILLINOIS

A New Way To Remove Broken-Off Bolt-Ends

Quickly at Low Cost!

With these remarkable new **RIDID LonGriP Extractors**, you can remove the most stubborn broken-off bolt or screw end in a few minutes, at the surface or down in a hole—often without even stopping machinery.

In two quick operations, you drill the threaded end to a thin shell with special drills and drill guides. Then you drive the patented *LonGriP* Extractor clear in—and turn out the embedded end.

No risk to threads, no worry about breaking, no slipping or reaming. For the *LonGriP* is full thickness its full length, fitting the drilled-out end snugly—no weakening taper. Straight flutes on its sides groove their way clear down, gripping securely. The bolt end HAS to come out.

Come in handy complete sets of tools for different sizes of screws, pay for themselves in time and expense saved on the first job or two. Try one. Boost your rep as an efficient trouble-shooter. Order a set from your Jobber today.



The Ridge Tool Co., Elyria, Ohio

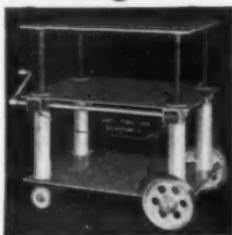
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STRAIGHT-FLUTED
SCREW AND PIPE EXTRACTORS

Hamilton Elevating Tables

enable one man to handle dies that would otherwise require two or three men to lift.

Send for illustrated circular.

The Hamilton Tool Co.
Hamilton, Ohio

**MICROMETER OFFSET BORING HEADS**

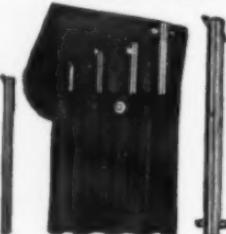
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A New Flynn Micrometer Offset Boring Head
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Boring Bars

The new small bars $\frac{3}{16}$, $\frac{1}{4}$, $\frac{5}{16}$ and $\frac{3}{8}$ in. dia. Set of 4-\$5. Larger bars up to $1\frac{1}{2}$ in. diameter.



Flynn Manufacturing Company
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"COMET"**Internal Boring and Threading Tools**

Use ready-made tools for ECONOMY & SERVICE

For holes from $\frac{1}{8}$ " up.
15 different sizes.
Easily resharpened.
Angles always maintained.

Write for complete data.



Time Saving . . Increased Production . . Greater Accuracy

COMET TOOLS INC., 39 Union Square
NEW YORK

The Lincoln Gold Medal

A board of awards, comprising H. L. Whittemore, chairman and G. T. Horton and A. G. Oehler has been appointed by the executive committee of the American Welding Society to supervise selection of the 1938 Lincoln gold medal winner. Regulations governing the medal award are:

1—**Donor** — Mr. J. F. Lincoln, President, Lincoln Electric Co.

2—**Purpose** — To encourage the presentation before the American Welding Society of papers which are effective in promoting the use of welding.



3—**Award** — The medal shall be awarded each year to the author or authors of the paper which in the judgment of the board of awards is the greatest original contribution to the advancement and use of welding.

4—**Eligibles** — For the author or authors to be eligible for the award, the paper shall describe clearly, original work done by them or under their immediate supervision on welding in any of its aspects and by any method or process.

The paper shall have been published

in the journal of the Society following the annual meeting issue—also presented or scheduled for presentation at any meeting of the Society, or a meeting of any section.

The paper shall contain no statement which might be considered as advertising or sales promotion—it shall be a full disclosure of the subject—and papers having more than three authors shall not be considered for the award.

Any one may be an author of a paper considered for this award, whether or not he is a member of the

American Welding Society.

The medals bear on the reverse, the name of each author of the paper, and are presented with a suitable certificate, at a session of the annual meeting of the Society during the year for which the award is made. Each author shall receive a medal and a certificate, which shall be duplicates.

The medals are inscribed as shown in the illustration, depicting the 1937 award to T. M. Jackson for his paper entitled "Welding in Tanker Construction."



for every need . . .

There's a type, form and size of Shear Cut End Mill for every job—it's designed and made by End Mill Specialists—precision manufactured from the finest materials—and you can depend on it to give economical, accurate results and long-lasting satisfaction.

If you have any special End Mill problems, our facilities and years of experience are at your disposal, without obligation. Just send your blueprints to us.

Write for your copy of the Progressive catalog.



PROGRESSIVE TOOL & CUTTER CO.

FERNDALE,

MICHIGAN

Black & Decker Portable Lectro-Shear

Offered in two models, 16 and 18 gauge sizes, the Lectro-Shear is intended for all types of sheet metal. It will cut on a radius as small as $\frac{3}{4}$ in., and easily follows a straight or patterned line. It cuts up to its rated capacity in steel, galvanized iron, monel metal and stainless steel; and at least 50% greater than capacity in copper, tin, aluminum, lead and other non-ferrous metals.

The shearing action is accomplished by the rapid reciprocating action of a vertical blade against a stationary horizontal blade, set in a special shoe which indicates the correct cutting angle and adapts the tool to all types of cutting work.

The unit is full ball bearing equipped (except the eccentric which is steel on phosphor bronze), and powered with a universal motor, operating on either A. C. or D. C.

Smooth, streamlined aluminum housings, compact assembly, and light

weight contribute to ease of operation. Simplicity of construction minimizes service requirements.

No adjustments are needed for varying gauges or types of metal. Blades may be reground without special fixtures.



No load speed is stated to be 2500 strokes per minute, and full load speed, 1500, on both models.

Net weight is given as $6\frac{3}{4}$ and 8 lbs. respectively, on the No. 18 and No. 16, and overall length 11 and $11\frac{1}{4}$ inches.

Standard equipment includes 3-wire cable and plug (3rd wire for grounding); thumb control switch; one set of blades. Standard voltage 110—also available for 220 or 250 volts.

For complete details, address The Black & Decker Mfg. Co., Towson, Md., on your business letterhead, and please mention The BLUE BOOK.

HERE'S A REAL DRILL VISE



Shur-Grip Jaws 5-in. wide, hardened, reversible; open 5-in. Hold round, square and odd shapes—usable three ways. Satisfaction guaranteed—price, only **\$12.50**

Write for folder and full information.

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85 Massachusetts Ave., East Providence, R. I.

—NO PACKING—NO PRIMING—

No Metal-to-Metal Contacts

GUSHER Coolant Pumps have no packing nuts to leak—consume power—require adjustment. Priming is automatic and instantaneous. There are no metal-to-metal contacts—this insures continuous, dependable delivery of coolant. There's a type for every need. *Send TODAY for complete information.*



Immersion Type



THE RUTHMAN MACHINERY CO.

538 E. FRONT ST.,

CINCINNATI, O. Outside Mounted

TOOLROOM COSTS GO DOWN

NOW YOU CAN GET
45,000 TO 65,000 R. P. M.

S.U.L.

SPEED UNDER LOAD

*The complete line
of Kipp Air Tools in-
cludes chippers and
filers as well as
grinders—they be-
long in your tool-
room, too.*

\$25



- When a grinding wheel is pressed against metal, it's the speed at which it turns that determines whether it really grinds or just wears the wheel.

A Kipp Air Grinder will give you—Speed Under Load—tremendous speed of 45,000 to 65,000 revolutions per minute. It's as easy to use as a lead pencil—actually less than 8 in. long and weighing under one pound and it may be used with Kipp wheels, cutters, abrasive rings, buffs and accessories for all grinding, cutting and polishing requirements.

Right now a Kipp Air Grinder is paying for a place in your toolroom by the time it could save you—the time of expensive men. Send the quick mail coupon No. 9 for free trial offer and full information.

MADISON-KIPP CORPORATION
204 Waubesa St., MADISON, WISCONSIN

CUT FINISHING COSTS 50% TO 75%

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STERLING SPEED-BLOC SANDER



Save time—money—labor and produce superior finishes at lowest cost. Replace slow, tiresome hand sanding and rubbing on wood, metal, fabric, leather, castings, stampings and composition surfaces. Designed for wet or dry work on curved and flat surfaces.

Let us tell you what Sterling is doing for others, and what it will do for you—Send for details.

STERLING PRODUCTS COMPANY

303-H Donovan Building

Detroit, Michigan

Ex-Cell-O Announces New Line Of Tungsten Carbide Milling Cutters

Intended to reduce replacement blade costs on tungsten carbide tipped milling cutters, Ex-Cell-O Corp., in cooperation with the Carboloy Co., offers a new standard line of milling cutters.

It is said that as a result of this standardization program, replacement blade and tip costs are materially reduced. A sliding scale of quantity prices has been adopted. In addition, the standardization will speed-up deliveries.

Under the arrangement, both Carboloy and Ex-Cell-O representatives will accept orders for Ex-Cell-O replacement and original cutters, as well as original and replacement blades, at the newly established standard prices.

The new cutters incorporate the Continental type "RC" blade lock, said to be selected for its simplicity of construction and adjustment, ruggedness

and economy in operation.

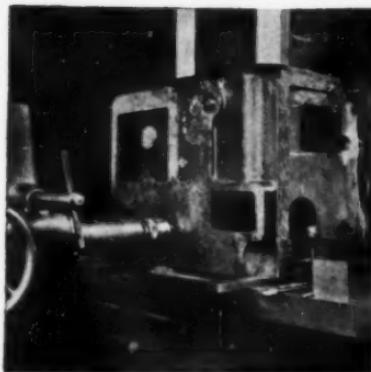
In this construction, tapered blades fit into accurately tapered seats, blade supports being integral with the cutter body. Blades may be adjusted individually any desired amount according to the grinding necessary on each blade—lowering grinding time and preventing waste of tungsten carbide in sharpening blades.

It is asserted that this type of blade lock facilitates set-up or changing of blades, since blades are locked in place in pairs with an external clamp, requiring only a turn of an Allen wrench to tighten or ease the clamp. A light tap then releases any individual blade from the cutter body for adjustment or replacement.

Other advantages claimed are the assurance of maximum heat conductivity through the provision of accurately fitting full-face seats, and the security of the blade lock without need for end stops.

Address Ex-Cell-O Corp., 1188 Oakman Blvd., Detroit, Mich., for complete information.

ADJUSTABLE WHILE RUNNING!



Consider Your Horizontal Boring Mill!

Here is a typical Horizontal Boring Mill job calling for speed and accuracy. The machine is a 5" bar Lucas, the tool equipment a Precision Universal Tool Head with No. 5 Morse shank. Body and shank are one integral chrome nickel steel forging, hardened and ground giving ruggedness and stamina to take $\frac{3}{4}$ " of metal out of a 6" hole at one pass. Precision construction gives instant adjustability

to "tenths" for finishing cuts. This one Tool Head handles all holes from 1/16" to 16" diameter. Recessing, backfacing and undercutting operations not visible in illustration performed at same time without any special tooling or lost time. The Precision Universal Tool Head has been adopted by the following manufacturers of Horizontal Boring Mills in their own plants and is recommended by them as preferred adjustable tool equipment for their machines: Lucas Machine Tool Co., Giddings & Lewis Machine Tool Co., Wm. Sellers & Co. and Universal Boring Machine Co.

THE PRECISION UNIVERSAL TOOL HEAD

This outstanding tool brings all adjustments under absolute micrometric control of the operator at all times and all speeds WITHOUT STOPPING TOOL OR MACHINE. It is the fastest and most accurate boring tool in existence. But in addition to that, it also faces, counterbores, turns outside diameters, mills flat surfaces and slots, undercuts, recesses, back-faces, trepans and does an almost limitless range of "headache" jobs that are utterly impossible with wrench-adjusted "offset" boring heads because such older types of tools cannot be cross-fed or adjusted while running.

One size Precision Universal Tool Head bores all holes from 1/16" to 16" diameter and will pass through any hole where a 4" bar will follow. Unsurpassed for internal threading.

SEND QUICKMAIL COUPON No. 60 FOR BULLETINS
AND ADDITIONAL INFORMATION.

THE PRECISION TOOL COMPANY, Bridgeport, Conn.

CUTS CLEAN

Whether it's a straight, circular or irregular job, the BEVERLY SHEAR gives a clean, sheared edge without knurl or distortion—and with minimum effort.

Made in two sizes, either of which may be carried in a tool box—No. 1 weighs 16½ lbs., and cuts up to 14 gauge.

No. 2 weighs 32 lbs. and cuts up to 10 gauge.

Reasonably priced—send for descriptive circular

THE BEVERLY SHEAR CO.
3807 W. 118TH PLACE,
CHICAGO, ILL.



Baldor Improves Carbide Tool Grinder

The Baldor Electric Co., 4368 Duncan Ave., St. Louis, Mo., announces several notable changes and refinements in the construction of their carbide tool grinder. Standard equipment now



includes a protector type tool support, indicating the angle at which the tool is being ground.

Also, the tool rest tables are now adjustable so that they may be moved towards the wheel, thus providing for wheel wear.

This grinder may now be supplied with a diamond wheel dresser, especially adapted to it.

For further details please write the manufacturer for bulletin No. 58.

Meylan Time Study Board

Here is something new in the way of time study equipment—a light-weight Bakelite board with secure aluminum holder that clamps the stopwatch tightly—a convenient cut-out arm rest and a wide movable clip for data sheets.

A. R. & J. E. Meylan, 266 West 40th St., New York will gladly send you a folder describing and illustrating this new time study board, also showing some 40 types of stopwatches, timing instruments, stopwatch stands, etc. In writing, please mention The BLUE BOOK.

Dardelet Self-Locking Screw Thread Profile With Improved Features

A new screw thread profile with improved features has been patented by Dardelet Threadlock Corp., 55 Liberty St., New York. Like the original, the new profile is self-locking, and requires no extraneous part to produce a positive lock of the two threaded members for their entire length of thread engagement.

Known as the Dardelet Relieved Profile, the new thread is said to offer a free-spinning nut, the rapid development of bolt tension, gradually increasing locking action, improved power or



grip of the lock, and the increased range of thread tolerances for manufacturing purposes.

The illustration shows bolt and nut threads in the unlocked and locked positions. The root of the bolt thread with the relieved profile (1) is stepped

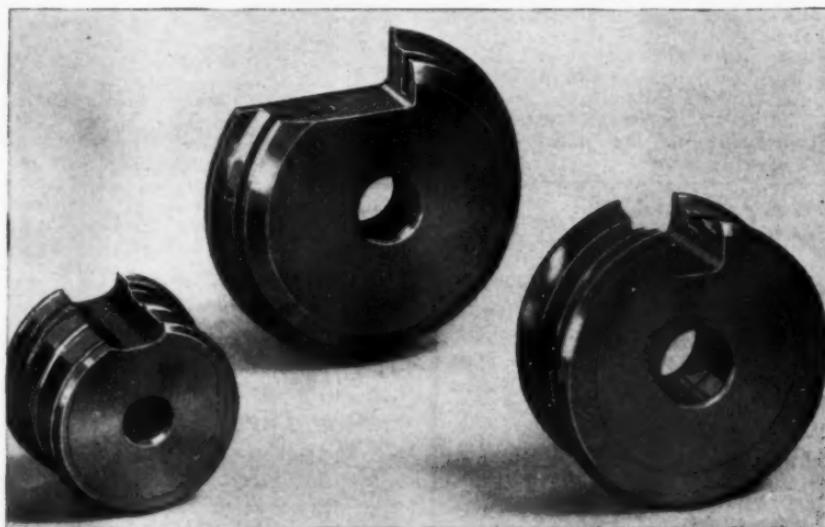
at the mid-point and each step is tapered 6-degrees with the axis of the screw. The lower step is undercut .003-in. to .005-in., depending upon the nominal diameter of the thread, in contrast to the original Dardalet thread which has a continuous tapered slope on the bolt thread root without any step. The tapered crest of the nut thread (2) remains the same. A clearance (3) exists between the assembled bolt and nut threads, permitting limited axial displacement, providing for

a change in relative thread positions from unlocked to locked.

Economical for the user in its free-spinning assembly, this is coupled with a wedged fit in the locked position. Thus, the free fit of class 2 American national threads is combined with a more intimate fit in the locked position than can be obtained with the costly class 4 fit, American national threads.

Address the Corporation for more complete information, and please mention The BLUE BOOK.

GROUND CIRCULAR FORM TOOLS IN 2 TO 5 DAYS



Having had extensive experience on the automatic screw machine and its uses, we have made all efforts possible to insure a circular form tool service that is of real assistance to the users of the automatic screw machine. Through the cooperation of our engineering department and tool grinding department, it is possible for us, when requested, to make shipment on circular form tools in from 2 to 5 days.

Our rigid inspection by the use of the most modern equipment obtainable insures a perfect tool ready for use in your own shop.

Realizing that service and quality are far more important than price, we would appreciate the opportunity of serving you. Send Quickmail Coupon No. 89 for our catalog.

BANNER MANUFACTURING COMPANY, Inc., 1873 CLYBURN AVENUE

CHICAGO, ILLINOIS

Broaching Axles With "Pull-Down" Machine

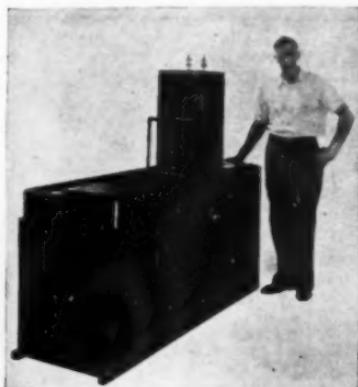
For small broaching jobs, even though the parts are quite large, Colonial Broach Co., recently delivered a new type pull-down machine. A job for which it is intended is broaching king-pin holes in front axles.

In operation, the axle is placed on the two plates shown in the machine. These are provided with simple locating fixtures without clamping devices. The broach is inserted from the top through the hole in the work and the face plate, into an automatic puller. The broach is pulled through the work, the work is removed and the machine returns the broach, the puller releasing it at the top of the stroke.

For some classes of work, the pull-down type machines are claimed to provide a better coolant and chip condition, since the coolant flows naturally through the hole with the broach. Chips drop through into the base.

The broach puller is of special self-cleaning design. The machine is of

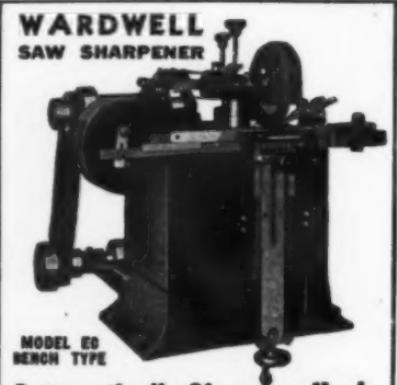
5-ton capacity with an 18-inch stroke. It is hydraulically operated, with variable speed control adjusted through a radial dial on front of machine. Maximum broaching speed is 30 ft. per



minute, with a high speed (60-ft. per minute) return.

The hydraulic mechanism is enclosed within the base, accessible by removing the sheet metal side cover. Control is manual. Ways are hardened and ground. The machine can be arranged for automatic broaching if desired.

Address Colonial Broach Co., 145 Jos. Campau St., Detroit, Mich., for full information, and please mention The BLUE BOOK.



Automatically Sharpens Hack, Band & Circular Saws

with teeth as fine as 32 to the inch,
at a speed of 30 to 75 per minute.

WRITE FOR CIRCULAR

The Wardwell Mfg. Co.
3165 Fulton Rd. Cleveland, O.

New Location for Ham- mond's Eastern Office

Hammond Machinery Builders of Kalamazoo, Mich., has moved their Eastern Branch into more spacious quarters at 71 West 23rd St., New York City (Phone GRAmercy 5-6619). Mr. W. J. Holtmeier, Eastern Manager, plans to display in the New York Office, several models of polishing lathes and grinders. He has been with Hammond for ten years and will serve all the Eastern States from North Carolina and Virginia to Maine, directly or through dealers and other representatives.

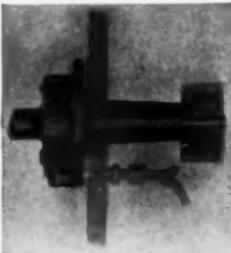
and 120 respectively. Net weight is given as 17½-lbs. and overall length 19½-in.

Address The Black & Decker Mfg. Co., Towson, Md., for further information, and please mention The BLUE BOOK.

Rollway Rotary Pump

Intended for the lubrication of bearings, gears, multiple spindle drill heads, and similar units, an "ASE" model machine pump is offered by the Pioneer Engineering & Mfg. Co., 31 Melbourne Ave., Detroit, Mich.

The unit is a compact, positive displacement rotary pump that can be mounted on practically any flat surface of the machine assembly.



All moving parts are of hardened steel, accurately ground to close tolerances. No gland is needed because the driving gear is inside the machine.

Mounted against the outer surface of the machine, it may be connected or disconnected without disturbing pipe lines or drive gears. Inlet and outlet ports through the machine casting are permanently connected with discharge and supply piping inside.

The pump is said to be a high vacuum unit which delivers liquid immediately after rotation is started, and stopping or reversing the machine has no effect on pump operation. An outstanding quality claimed is the ability to hold its prime indefinitely.

Address the makers for any further information and please mention The BLUE BOOK.

FOR FIVE CONSECUTIVE YEARS

UNIVERSAL BUSHING SALES
INCREASED 50% EVERY YEAR
OVER THE PREVIOUS YEAR'S VOLUME

• BECAUSE —

Universal Drill Bushings

ARE

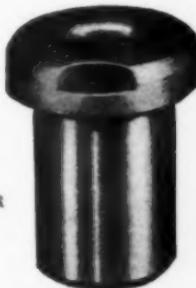
ACCURATE

MADE TO

A. S. A.

SPECIFICATIONS

10 PER CENT LOWER
IN FIRST COST



INTERCHANGEABLE

WITH

OPTIONAL LOCK

EXCEPTIONALLY

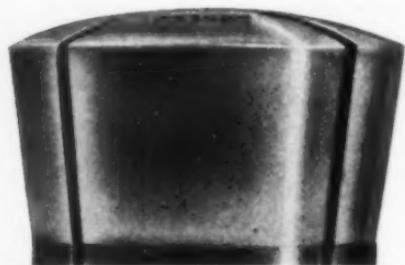
LONG LIFE

UNINTERRUPTED

SOURCE OF SUPPLY

*Send Quickmail Coupon No. 50
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Collet Chucks and Drill Bushings.*

**UNIVERSAL
ENGINEERING CO.
FRANKENMUTH, MICHIGAN**



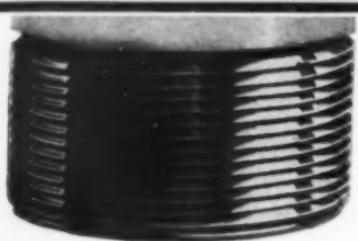
You'll Find the Same
"MODERN"
DEPENDABILITY In
LATHE COLLETS

Dependable performance can always be expected of "Modern Products"—and Modern Lathe Collets can by no means be excepted. Made to exactly the same high quality standards as the well known "Modern" screw machine collets, they do their job the way it should be done—efficiently and economically.

Thousands of Modern Lathe Collets are carried in stock at all times. Regardless of type or quantity, your requirements can always be met without delay.

*Be sure to have complete information
 on Modern Lathe Collets.
 WRITE TODAY.*

**MODERN COLLET
 and MACHINE CO.**
 403 Salliotte Street - Ecorse, Mich.



Roe Polishing Lathe

Users of polishing lathes should be interested in the new unit announced by Lewis Roe Mfg. Co., 1050 De Kalb Ave., Brooklyn, N. Y.

An ingenious brake minimizes the chance of accident by permitting instantaneous stopping. When belt is shifted to loose pulley, a locking device engages the brake and causes stoppage.

There is an additional advantage—when brake is engaged, buffs or wheels can be tightened at either end of spindle without need of a wrench at the other end.



Spindle friction is reduced by Timken roller bearings, which is said to effect a noticeable saving in power, as revealed by tests at Pratt Institute. Rigidly constructed, the units weigh from 225 to 425 lbs. An outlet is provided for draining superfluous oil. Bearings have take-up for wear, and lubrication is by Alemite grease cups.

The semi-steel belt shifter has bronze shifter fingers. Loose pulley is ball bearing mounted. Spindle ends are threaded for taper points.

Address the makers for further information, and please mention The BLUE BOOK.



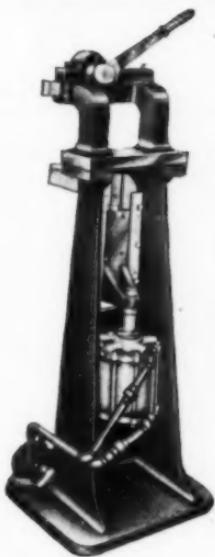
for
your
lathes

SENECA FALLS Automatic WORK DRIVER

Self Centering . . . Quick Acting . . . No Slip. Attaches to any chuck plate or spindle. Provides a slip-proof, balanced drive reducing chatter. Handles rough forgings or turned pieces—straight or taper. Eliminates dogging time. Reduces tool breakage. Write for details and size range.

SENECA FALLS MACHINE CO., 314 Falls St., Seneca Falls, N. Y.

SCHMIDT "Hi-Duty" Pneumatic MARKING MACHINE



MODEL 25
(Side view shows
air cylinder)

ADVANCED BUSINESS METHODS demand improved records of metal fabrications. This machine makes marking operations quick and simple. Part numbers—order numbers—manufacturer's name and other important data marked on your products will mean permanent records, to last the life of the part, and REPEAT ORDERS, a vital part of any business.

The Schmidt Model 25, illustrated at left, is a light, general purpose hand marking machine, with a supplementary air cylinder to take the place of the foot pedal in raising the work to the lettering tool. Air from the shop line is used, and the four-way foot valve assures fast operation. This machine uses solid flat or round dies as well as the adjustable type, in a flat or knurl type holder. The use of the air cylinder, by reducing operator fatigue, greatly increases production on continuous marking operations.

SPECIFICATIONS

Will mark flats or irregular surfaces up to 4" thick.	
Will mark rounds up to 10" diameter, or bars up to 4" diameter.	
Carriage or Die Stroke.....	2 $\frac{1}{2}$ "
Throat—Center of die to front of uprights.....	3"
Roller Bearing Die Slide.	
Table Rise—Low to High Position.....	8"
Table Rise by Air Cylinder.....	3/2" - 1"
Table Pressure 2400 lb. at 75 lb. line pressure.	
Table Dimensions 5 $\frac{1}{2}$ " x 9 $\frac{1}{2}$ " with 2" x 4" slot.	
Operates on line pressure of 30 lb. to 100 lb.	

Send Quickmail Coupon No. 70 for complete catalog of our full line of Marking Tools, Machinery and Equipment.

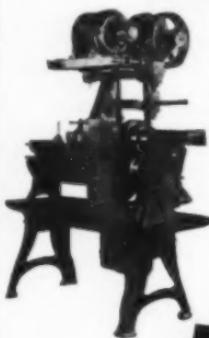
GEO. T. SCHMIDT, Inc.

1802 Belle Plaine Ave., Chicago, Ill.
Builders of Marking Equipment Since 1895.

BERKELEY

"CUSTOM-BUILT" MOTOR DRIVES

are engineered by Drive Specialists to fit your specific requirements—and to meet present-day needs for economy in initial and operating costs. Supporting members are of rugged, welded construction—in sturdy box or truss form—designed and built especially for your machines—not merely adapted from standard parts or improvised castings.



Berkeley Drives are available in capacities from $\frac{1}{4}$ to 20 hp, for your lathes, milling machines, shapers, screw machines, drills, grinders, etc.

SEND TODAY FOR
YOUR COPY!

This big new Berkeley Catalog illustrates 33 typical Berkeley applications... shows you that Berkeley has the experience and the facilities to solve your drive problems.



**BERKELEY ENGINEERING
CO., CLEVELAND, OHIO**

Hanna Portable Pneumatic Squeeze Riveter

Hanna Engineering Works, 1765 Elston Ave., Chicago, Ill., present a new riveter development with many interesting features.

It is a compact, lightweight, portable pneumatic squeeze riveter for setting $\frac{1}{4}$ and $\frac{5}{16}$ -inch rivets cold. It may be used as illustrated for setting vertical rivets, or rotated for driving horizontal rivets.



The complete machine is said to weigh less than 100-lbs., and may be suspended from a balancer to provide all vertical movement. A universal suspension bail permits use of the riveter in any position, also tilting from side to side for easier entry on some work.

The operating valve is in the rear cylinder head, and is used to guide the riveter. After completing the power stroke, the valve automatically reverses, returning the dies to the open position ready for the next rivet.

It is pointed out that the operating speed of 50-strokes per minute, and compactness of the unit assure maximum riveting speed. The yoke may be of any required design and reach to fit the job.



This Flexible Shaft Unit is ideal for grinding, polishing, carving, burring, filing, etc. BECAUSE motor is 1/10 h.p. possessing many times more power than hand-grinders. BECAUSE continuous use of our handpiece will not heat it up since ball bearing. BECAUSE handpiece fits operator's hand to perfection. Only $\frac{3}{4}$ " O. D. Tiring of hand impossible. No vibration. BECAUSE Rheostat permits of variable speeds up to 12000 r. p. m. 600 different burs, files, felts, rubbers, wheels and stones in stock. Write for catalog.

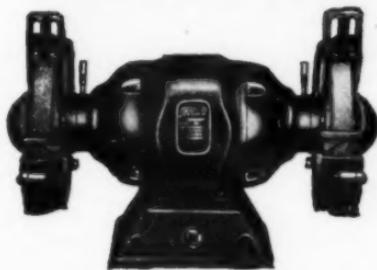
American Rotary Tools Co., 44 Whitehall St., New York, N.Y.

BALDOR

BALL BEARING GRINDERS

6" to 12"
BENCH AND PEDESTAL TYPES

these HE-MAN Grinders



are really TOUGH

**HEAVY, STURDY-BUILT FOR
LONG LIFE
THEY CAN
"TAKE IT"**



Not a "sissy" in the line!

Plenty of "active" material—extra overload capacity. They stand up and deliver—hour after hour.

BALDOR ELECTRIC COMPANY
4368 Duncan Ave., St. Louis, Mo.

Get Action — MAIL QUICKMAIL COUPON No. 18

BALDOR GRINDERS
are built by Motor Specialists

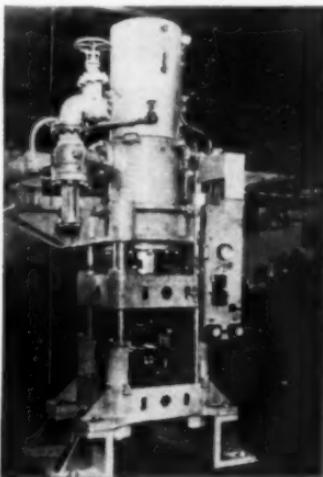
Lake Erie 300 Ton High Speed Press

Adapted for a wide variety of production purposes, especially stamping and coining, a new 300-ton press is announced by Lake Erie Engineering Corp., Kenmore Station, Buffalo, N. Y.

It was designed for operating up to 20-ton inch strokes per minute at full tonnage.

It is claimed that absolute control of power, speed and pressure has been

engineered into the sensitive and conveniently located controls. The selector control permits the operator to choose jog, single cycle or continuous operation. Control of these three ranges of operation is by two push buttons located on the control panel. The pressure is adjustable up to the full 300 tons and the dwell at the top of stroke is also adjustable.



All Enclosed V-Belt Drive HAND MILLER

Power Feed if desired



Write for details—also information on our Milling Machine Vises.

Miller & Crowningshield

ESTABLISHED 1906

Greenfield,

Mass.

The maximum adjustable stroke on this press is 12-inches. Distance between columns R-L is 24-inches and F-B is 36-inches. The daylight opening is 27½-inches.

Address the makers for further information, and please mention The BLUE BOOK.

THE

"Super" Speed Air Grinder An Outstanding Performer

The ONLY Hand Grinder with Spindle Speed of 100,000 R. P. M. Operates on Air Pressures of 45-100 pounds. Weighs 8½ ounces.

WRITE FOR FULL PARTICULARS

M-B PRODUCTS

132 E. Larned St.,

M-B

Combined Automatic Lubricator and Air Line Filter

Delivers Absolutely Clean, Lubricated Air to Bearings of Any Tools Operated Off Air Lines. Eliminates Costly Shut Downs.



Detroit, Mich.



**Machinists Tool
Grinding Co.**

3040 W. Van Buren St.,
CHICAGO, ILLINOIS

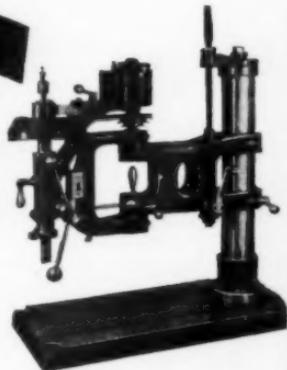
WHY DISCARD DULL POWER HACK SAW BLADES?

Your dull blades can be sharpened over and over again at the low cost of $2\frac{1}{2}$ ¢ per inch (12 blades or more).

New blades can have their efficiency increased 50% by sharpening before using, a time saving worth many times the nominal price spent for grinding.

A Time Saver In Any Shop

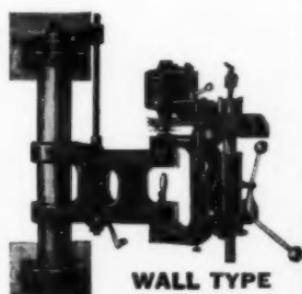
AYER SENSITIVE BENCH RADIAL DRILL



A rugged, modern, ball bearing sensitive drill, with all the advanced features found in high class tools of this kind.

Sensitive balance of spindle at all speeds is provided by long extension spring within drill frame. Depth gauge and graduated sleeve are provided.

Drill capacity $\frac{1}{2}$ "; minimum distance spindle to column 6"; maximum distance $3\frac{1}{2}$ "; minimum distance spindle nose to base 4"; maximum distance 21"; spindle travel 5"; spindle bore Morse No. 2; high grade geared $\frac{1}{2}$ " chuck furnished in place of Morse Taper if preferred.



WALL TYPE

Furnished in either bench or wall types. Spindle can be equipped with tapper or motor equipped with reverse switch. Motor bracket is located for larger or different make motors.

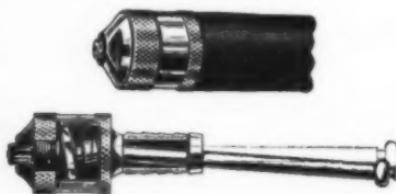
Quickmail Coupon No. 17 will bring you full information and low prices.

Choice territory open to progressive dealers.

**F. H. AYER MFG. CO.,
CHICAGO HEIGHTS, ILLINOIS**

Air-O-Chek Air Valve

Air-Way Pump & Equipment Co., 617 West Jackson Blvd., Chicago, Ill., offer an air valve of original design, which is radically different in mechanical construction and method of operation from conventional types of hand-operated air valves.



All operating parts are ingeniously enclosed within the valve and air hose. There are no external control levers or buttons of any kind to snag and no packing glands to leak. No protruding parts of any kind to snag or catch on clothing or machinery.

The actuating lever or trigger stem extends back from the nozzle into the hose. At the nozzle end is a ball and socket joint, through which the valve is operated. The valve is always ready for use. Only a slight pressure of the thumb and hand, flexing the hose, suffices to move the trigger stem and open the air control valve. The air volume and velocity may be throttled and controlled by the extent to which the hose is flexed. Instant and positive shut-off is effected by release of hand pressure and dropping the hose.

The Air-O-Chek is made from solid bar stock throughout—brass and stainless steel, manufactured to precision standards. All internal parts are free floating, easily accessible for servicing by unscrewing the threaded nozzle head.

Air-O-Chek valves are available with tip No. N1 in $\frac{1}{4}$, $\frac{3}{8}$ and $\frac{1}{2}$ -inch sizes. Extension tips also available include $\frac{1}{4}$ -in. flat; $\frac{1}{4}$ x 3-in.; $\frac{1}{4}$ x 4-in.; $\frac{1}{4}$ x 5-in. and $\frac{1}{4}$ x 10-inches.

NEW! EKLIND Universal Milling Head equipped with HYDRA-SPEED DUPLICATOR

For accurate and fast duplication of dies from master model or template.

Adaptable to any Milling Machine.

Instant, smooth, vertical motion is imparted HYDRAULICALLY to cutter spindle at exact rate required to follow contour of model.

Write today for circular

**UNIVERSAL
HIGH SPEED TOOL CO.**
549 W. Washington Blvd., Chicago





Write today to

**GROBET FILE CORP.
OF AMERICA**

3 Park Place,

New York City

**Ask for our
Catalogs**

Catalog RW illustrates a great many shapes and sizes of rotary files and rasps.

Catalog NW illustrates more than 4000 different precision Swiss files.

*For the First Time! Vacuum Cleaning Made Applicable
to All Plant Cleaning Requirements at Low Cost With*



**Breuer's Ball Bearing
TORNADO
Portable Industrial
Vacuum Cleaner**

This new machine is designed to solve all industrial cleaning problems without the expense of installing a stationary plant or using so called portable cleaners which are too heavy and expensive for average plant applications.

**TREMENDOUS POWER
1 H. P. Motor—46 $\frac{1}{4}$ " Waterlift**

Do not confuse the TORNADO with light-duty cleaning machines. Model 112 combines light weight (only 40 pounds) with tremendous cleaning power (1 H. P. G. E. ball bearing Motor—46 $\frac{1}{4}$ " waterlift). Patented principle of separating fine dust from refuse and depositing heavy dirt in tank makes this cleaner as applicable to heavy duty work as the largest machines. Sturdy construction insures long life and low yearly cost.

Has plenty of power and capacity to handle dust, dirt, sand, sawdust, metal scraps, filings, etc. Attachments available for cleaning boiler tubes, ovens, machinery, walls, floors, pipes, etc. Motor unit can be quickly removed for blowing dust from motors, etc. The handiest heavy duty, low cost, time and labor saving unit ever built.

We prove TORNADO advantages right in your plant without obligation. Send Quickmail
Coupon No. 30 for details of trial offer and further information or write to

BREUER ELECTRIC MFG. CO.
842 BLACKHAWK STREET, CHICAGO, ILLINOIS

CENTERLESS GRINDING

17 years' experience with
all types of work and
materials.

Equipped to give you production grinding
to total tolerance of .0001 in.

*Inquiries Solicited—
Prompt Service*

ERTEL MACHINE COMPANY

1420 East 20th St., Indianapolis, Ind.

POLISHING

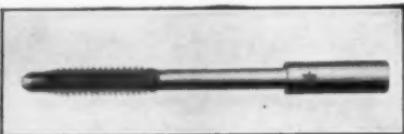
HEAT TREATING

Carboly Solid Cemented Carbide Taps

Carboly Co., Inc., Detroit, Mich., announce taps of solid Carboly cemented carbide for use on unfired porcelain. Dimensions are $1\frac{3}{4}$ in. long x .153 dia., 36 pitch, full vee thread.

Such a tap is stated to have tapped 70,000 holes up to the first regrind, with an estimated life of 280,000 holes.

Further, it is said that high speed steel taps in this service give 250 holes per grind and a total of 1000 holes per



tap. The steel taps required regrinding every couple of hours or less.

Experience with these taps has been confined to materials such as Bakelite, unfired porcelain, hard rubber,

slate, etc., but further developments may prove Carboly taps to be applicable to other materials.

Complete information may be had by addressing the makers.

Ohio Welding Nuts

The Ohio Nut & Bolt Co., 600 Front St., Berea, Ohio, announce a new line of welding nuts in response to the demand following introduction of welding bolts.

The nuts have four welding points or projections which are all of uniform



height, assuring satisfactory flow of electric current through the points of contact. It is further pointed out that the points are spaced so as to obviate

any difficulty in setting up electrodes on welding machines, and to prevent molten metal splashing into the threads.

It is stated that the nuts may be welded to a sheet metal surface practically instantaneously. In many cases, using standard 60-cycle current, the actual welding time is said to be equivalent to two or three cycles, showing a saving over the cost of brazing, and permitting attachment of the nuts to places where brazing is impracticable. Obviously, it is inadvisable to try to weld the nuts to surfaces that are plated or enameled. Such finishes should be applied after welding.

The nuts are said to open new fields in designing. For instance, in the internal parts of gas meters for the purpose of hanging or assembling brackets or other parts without incurring any danger of gas leakage through the shell. The same advantages apply to other products such as transformers for outdoor use, electric refrigerators, storage tanks, etc. In many cases, the

nuts may be welded to sheet metal, eliminating forgings and castings. Blank nuts can provide bearings of the through type or collar type for shafts or push rods.

The nuts are now available on a production basis, in sizes up to and including $\frac{3}{8}$ -in. Should the demand develop, they will be available in 7/16 and $\frac{1}{2}$ -inch sizes later this year.

Address the makers on your letter-head for further information, and please mention The BLUE BOOK.



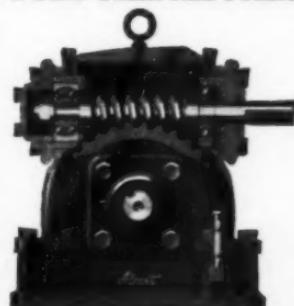
SAVE 80%
On Hack Saw Blades

Regrind each
blade 4 times.
Price of \$15.75
includes one
grinding wheel.

C. H. CARLSON MFG. CO.
13-15 Main St., N. E. Minneapolis, Minn.

POWER Profit or Loss

ABART TYPE A WORM GEAR REDUCERS

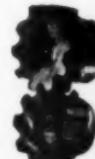


Abart Reducers adhere to the principle of correct power transmission and speed reduction. They minimize power loss and in this sense may be said to more than earn their keep. We have engineered notable savings for others—why not you?

Write for Bulletin 900.

GEARS

Any type, material, quantity. Cut to specification *precisely*. Prompt deliveries—as required.



Abart

GEAR AND MACHINE CO.

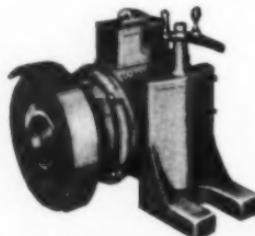
MANUFACTURERS OF
Speed Reducers & Gears

4832 WEST 16th ST

CHICAGO, ILLINOIS

Wodack Grinding Machine

Two types are included in the line of grinders offered by Wodack Electric Tool Corp., 4629 W. Huron St., Chicago, Ill. One of these is equipped with a tool post shank and the other has an angle plate. Both are available without provision for feed, with vertical or horizontal feed, or with both.



The $\frac{1}{2}$ -h.p. motors with which they are equipped, have ventilating fans to cool the windings, and removable filter pads to prevent entrance of abrasives.

The motors are of the single phase type, for operation on 110-volt a.c.,

at 3500 r.p.m. Toggle switch is mounted in a box on top of motor housing, and 15-ft. of 3-conductor rubber covered cable with unbreakable plug is included.

An $8 \times \frac{1}{4}$ -in. grinding wheel is carried on the motor shaft, protected by a guard. An extension piece is available for internal work. Oil holes with brass plugs provide for lubrication.

Address the makers for further information, and please mention The BLUE BOOK.



TANNEWITZ

24" Hi-Speed Band Saw

SAWS NEARLY EVERYTHING

Including Wood, Sheet Steel, Brass and Aluminum Casting Gates, etc.

1½ H. P. Direct Motor Drive.
Also 30"-36"-42" Sizes.

TANNEWITZ WORKS, GRAND RAPIDS, MICHIGAN

BEFORE BUYING



CHECK THESE VITAL POINTS:

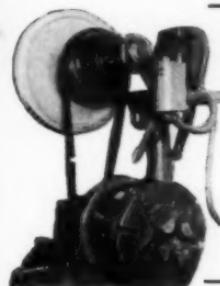
- 1—Size and shape of bearing block?
- 2—Overhang or distance from shank to boring bars?
- 3—Simple or complicated design?
- 4—Accuracy or readability of dial screw?
- 5—Range of boring jobs?
- 6—Are boring bars, wrenches, etc. included?
- 7—Is the price reasonable?

CRALEY OFF-SET BORING HEADS

meet all your requirements. Made in 7 sizes for everything from the smallest holes up to 20" diameter.

Write for full information.

C. C. CRALEY MFG. CO., SHILLINGTON, PA.



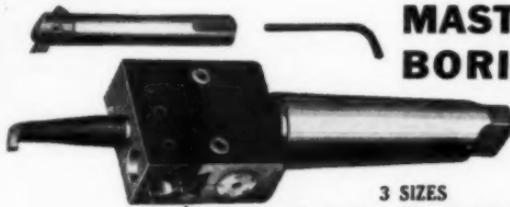
MODERNIZE WITH DIRO DRIVES

Lathes, Shapers, Milling Machines, Drill Presses, Power Saws and other cone pulley machines.

Full-floating, vibrationless motor carriage with constant automatic belt tightener—and other advanced features. A simpler, smoother, better drive at a reasonable price. Send for full information.

Jobbers and Distributors Wanted—Protected Territory Available.

DIRO DRIVE MFG. CO., 1461 S. Michigan Ave., CHICAGO, ILLINOIS



MASTUR Precision BORING HEAD —

3 SIZES

No. 5—Boring Cap. 7" ... \$37.50
 No. 6—Boring Cap. 11" ... 65.00
 No. 7—Boring Cap. 15" ... 90.00

No gib, perfect adjustment, direct reading in thousandths, Vernier reading in two-tenths of a thousandth. Every working part adjustable for wear.

MAXWELL UTILITY GRINDERS

A Precision Tool—Sturdy and Dependable



TYPE E Complete as illustrated for internal and external grinding. $\frac{1}{2}$ H.P. five speeds 3500—14000 R. P. M.—\$170.00.

Motor heavy duty constant speed mounted on rubber. Spindle equipped with four precision ball bearings, always perfectly adjusted regardless of temperature or wear. We manufacture other sizes and types. Send Quick-mail Coupon No. 32 for catalog.

Our guarantee—Your satisfaction.

F. A. MAXWELL CO., 300 Broadway, Bedford, O.

Armstrong Wrenches For Hollow Screws

Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill., announce a new line of wrenches for hollow screws.

Instead of wrenches formed from lengths of hexagonal bar stock, the user can now assemble a tool of size, shape and length needed from a set of interlocking drivers, handles, extensions and ratchets.

In general, the new wrench resembles the detachable head of a socket wrench, but instead of a socket to fit over a screw head, there is a protruding hexagonal driver that fits into the hollow screw.

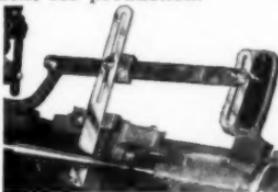
Ten sizes fit all hex nut hollow screws and cap screws from $\frac{1}{4}$ to 1-inch diameter. An AL-100 set, comprises 10 wrenches, two reversible ratchets, three sliding T-handles, two extensions and an adapter in a fitted steel case. The wrenches, handles and extensions are made of Chrome-Vanadium tool steel. The reversible ratch-

ets are drop forged with hardened steel gears, and it is claimed, an improved action. All wrenches and parts are chrome plated.

Address the makers for any further information—and please mention The BLUE BOOK.

F. L. Avery Develops New Atlas Taper Attachment

Sound ideas on design improvement are often advanced by machine tool users. Last Fall, Mr. Frank L. Avery of New York developed some ideas about a new type taper attachment for his Atlas bench lathe. He presented these ideas to Atlas Press Co., engineers who were favorably impressed, and assisted them in preparing the new attachment for production.



For Machine and Tool Work & Quick Set-Ups

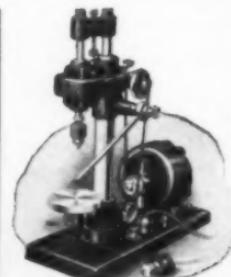


use Reich's, the only 3 way reading precision Indicator. Contact point mounted in centered cone bearings. .014 reading. Order direct or through your dealer.

Price \$5.00. Write for folder.
J. R. REICH MFG. CO.
338 Triangle Ave., Dayton, O.

The advantages of the new Avery attachment have been recognized at once. It is said to be simple in design, quickly installed and priced at a fraction of the cost of previous devices of the kind.

Copies of the Atlas catalog No. 28 containing a complete description are available from Dept. A, Atlas Press Co., Kalamazoo, Mich.



HAMILTON — MUEHLMATT SUPER SENSITIVE DRILLING MACHINES

Drilling small holes in the smallest wire gage sizes is no problem with Muehlmatt Drilling Machines. They are used extensively for drilling Diesel Injector Nozzles.

Muehlmatt Drilling Machines are the answer to your small drilling problems. Let us tell you more about them. Write for information.

**A. MUEHLMATT DIVISION OF
THE HAMILTON TOOL COMPANY**

**Hamilton,
Ohio**

A.S.T.E. Detroit Show Scores a Startling Success

An encore for 1939, with many of the exhibitors immediately reserving space—that's unmistakable proof of the outstanding success of the First National Machine & Tool Progress Exhibition which closed in Detroit, March 12.

For enterprise in conceiving and ability in handling this initial show, the Society deserves recognition and credit. Launched and staged in the midst of a severe recession, with but little more than two months of promotion, the show packed Convention Hall with production men from all over the country for four days, providing enough direct sales and sales leads to keep sales forces busy for weeks to come. More than that, it gave the morale of industry a powerful boost at a time when it was needed—and it was no mere "shot in the arm".

Of the 23,755 registrations at the show, about 500 were classifiable as "general public or curiosity visitors".

The rest included such people as production executives, master mechanics, superintendents, foremen and sales representatives of machine and tool companies that did not have exhibits in the show and wished they had.

Many of the 162 exhibitors showed their machines in operation. Several plastic molding machines turned out souvenir samples of work. Hydraulic riveting equipment attracted much attention, as did the crossed-axis rack machines cutting gears in production, and the welding equipment.

About 1100 availed themselves of the tours to major production plants in the Detroit area.

The technical sessions were instructive and interesting with papers and discussions on pertinent topics.

Walter F. Wagner, Master Mechanic of the Lincoln Motor Car Co., was elected President of the Society for the coming year.

MODERN DIE-MAKING MACHINES



Here's Value!
GROB

DIE-MAKING
MACHINES

A MODERN DIE-FILING MACHINE
AND A DIE-SAWING MACHINE

Complete, ready to run . . . Both for

\$379.00



S-14 Price \$192.40
Includes: Motor, Electric
Brazier, Hand Grinder,
Saw Blade, etc., ready
to operate.

This is only one of many economical combinations of Grob Die-Making equipment. There are many more. Ask about them. Send for the new complete detailed catalog.

B-3 Price \$186.60
Includes: Motor,
Stand, 1 Flat File,
etc., ready to
operate.

G R O B B R O T H E R S
GRAFTON, WISCONSIN

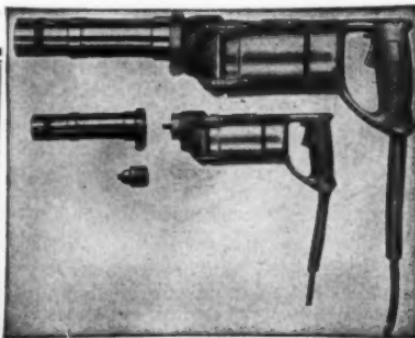
CP Combination Electric Drill and Hammer Drill

Chicago Pneumatic Tool Co., 6 East 44th St., New York, announce a new combination No. 200-2700 electric drill and hammer drill.

It is a 5/16-in. heavy duty universal drill that can be converted within a few seconds into a self-rotating hammer drill (and vice versa) of 1/2-in.

capacity in concrete, brick, stone, etc. It can be used for light chipping by applying a lock collar to stop rotation. The illustration shows the tool as a hammer drill and how the conversion is made.

Standard equipment includes a 3-conductor cable and plug; 5/16-in. 3-jaw key chuck; one drill steel as selected; drill steel holder and drift; hand clamp; rotation lock and spring; Alemite



We Specialize in **HOLLOW BORING**



**LATHE SPINDLES
SPINDLE SLEEVES
PISTON RODS
RAMS
HYDRAULIC CYLINDERS,
etc., etc.**

**ANY GRADE OF STEEL—
CARBON OR ALLOY.**

*Send Blueprints
for Estimates*

**AMERICAN HOLLOW
BORING CO.**

1035 W. 19th St.,

Erie, Pa.

grease gun and 1-lb. of grease; 5/16-in. socket wrench and steel carrying case. Optional equipment—for chipping, a flat chisel instead of drill steel and holder.

Number of blows per minute is given as 2700; net weight 11 1/2-lbs., and overall length 18-inches.

For further information, address the makers on your letterhead, and please mention The BLUE BOOK.

"Buy Economy — You'll Effect Economy"

**SOCKET HEAD
CAP SCREWS**

*Milled
from Bar*



**HOLLOW
SET SCREWS**

*Made of
Alloy Steel*



**ECONOMY MACHINE PRODUCTS CO.
5207 LAWRENCE AVE. CHICAGO, ILL.**

Williams Carbon Steel Wrenches

An improved type of carbon steel wrench is being offered by J. H. Williams & Co., 75 Spring St., New York City, in a complete standard line of 50 patterns and more than 1000 sizes. Asserted to be approximately twice as strong as old-fashioned carbon steel wrenches and averaging 93% as strong as alloy steel wrenches of corresponding size, tests are said to reveal that



these "Superior" wrenches actually are stronger than the double head engineers' pattern alloy wrenches of popular thin design.

The unusual strength characteristics of these wrenches are attributed to the fact that they are drop forged from an improved quality of carbon steel and especially processed to the exacting specifications of the manufacturer.

The improved wrenches are stated to cost no more than old-fashioned carbon steel wrenches, and considerably less than alloy wrenches. Other advantages claimed are better hand grip, greater and safer bearing on the nut.

The Williams Co., recommend their carbon wrenches for most industrial uses, and their Chrome-Molybdenum

wrenches for automotive and other purposes where operation in close quarters is required, where higher polishing and chrome plating is desired, or where that extra 7% of strength is essential.

A new booklet "How to Select and Use Wrenches" gives full information on the new "Superior" line, as well as providing much useful handbook information, is being offered without charge by the manufacturer. In writing, please mention The BLUE BOOK.

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give you economy and high production. Readily adapted with collets or step chucks. Hand or foot operated, with patented automatic brake. Two-speed dust-proof motor operates continuously without overheating.

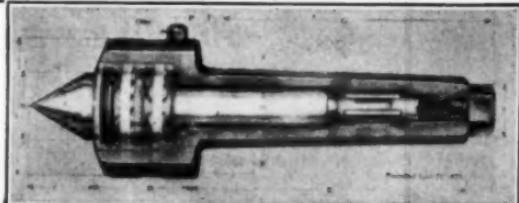
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Schauer Machine Co.
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Especially adapted for heavy work. Equipped with a combination of precision type ball and roller bearings to assure rigidity and maximum capacity for high speed production and longest possible service. Bearings can be renewed if necessary at slight cost.

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MICH.

Dumore Fractional H.P. Universal Motors

Bulletin 705 gives specifications and considerable information pertaining to the latest development in Dumore's wide line of fractional h.p. universal motors.

Types HL and HVL—types H and HV with single reduction gear units are identical except that the former has a totally enclosed housing and 30-minute rating—the latter, a ventilated

housing and continuous rating. Mounting on the base of the gear unit assures rigidity. A double gear shaft extension permits either direction of rotation without changing the rotation of the armature.

Standard motors have a 12-coil winding and 12-bar commutator. Where



considerably more power is required, a 24-coil winding and 24-bar commutator may be provided.

Address The Dumore Co., Racine, Wis., for a copy of the bulletin, and please mention The BLUE BOOK.



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Write for our new 288 Page Catalog.

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FLANGE SAVES $\frac{1}{3}$ rd.

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Type
WF



50,000 R. P. M. Turbine Grinder

Experienced die makers will tell you why they like the Onsrud MD-1 Grinder. Here is a 50,000 R.P.M. unit with $\frac{1}{4}$ H. P. that actually makes the work fly. Handles with superb ease. Won't heat up by overloading. Stays out of the repair shop because it is sturdy built. Can also be mounted and used as a stationary grinder. *Write for bulletin.*

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- Weight 1 lb. 15 oz.
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- Vibrationsless
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Types shown at right, top to bottom, are: plain stationary press fit, type 'P'; shouldered stationary press fit, type 'S'; removable slip, type 'R'.



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NEW TRADED LITERATURE



MILLING MACHINE PRACTICE

The Cincinnati Milling Machine Co., Cincinnati, O. 16 pages $5\frac{1}{2} \times 8\frac{3}{4}$ in., reprinted from latest edition Kent's Mechanical Engineers' Handbook.

PORTABLE ELECTRIC TOOLS

Wodack Electric Tool Corp., 4629 W. Huron St., Chicago, Ill. 24 pages $3 \times 6\frac{1}{4}$ in., illustrating and describing the Wodack line of drills, hammers, grinders, buffers, groovers, etc.

PORTABLE ELECTRIC TOOLS

The Black & Decker Mfg. Co., Towson, Md. 54 pages and cover $8\frac{1}{2} \times 10\frac{1}{2}$ in color, presenting the complete B.&D. line for 1938 including drills, nut runner, tapper, refacer, Lectro-shears, die grinders, sanders, polishers, saws, Lectro-Kleen process, etc.

PRECISION TWO JAW CHUCKS

The Cushman Chuck Co., Hartford, Conn., 8-pages $8\frac{1}{2} \times 11$ giving complete specifications and data on Cushman 2-jaw, medium duty, self-centering chucks.

CARBIDE TOOL GRINDER

Baldor Electric Co., 4368 Duncan Ave., St. Louis, Mo. Bulletin 58, $8\frac{1}{2} \times 11$ illustrating and giving full information on the Baldor Carbide Tool Grinder and Diamond Wheel Dresser.

"MASTERALL" REAMER

Barber-Colman Co., Rockford, Ill. 4 pages $8\frac{1}{2} \times 11$, giving large scale illustrations, specifications and complete description of B-C Positive, adjustable expansion reamer.

FRACTIONAL HORSEPOWER UNIVERSAL MOTORS

The Dumore Co., Racine, Wis., 2 page bulletin $8\frac{1}{2} \times 11$ illustrating, describing and giving full information on the wide line of Dumore fractional horsepower universal motors.

G-E INSTRUMENT BULLETIN

General Electric Co., Schenectady, N. Y. 4 pages, $8\frac{1}{2} \times 11$, on instruments in industry, published by the Meter Division.

SPROCKETS, DRIVES, SPEED REDUCERS

Cullman Wheel Co., 1359 Altgeld St., Chicago, Ill., 78 pages $8\frac{1}{2} \times 11$ in plastic cover giving complete specifications and data on the Cullman line.

SAFETY SOCKET SCREWS

Safety Socket Screw Corp., 4440 N. Knox Ave., Chicago, Ill. 28 pages, $6\frac{1}{2} \times 9\frac{1}{2}$, loose-leaf, giving specifications, illustrations and complete information on the complete line.

DIAMOND DRESSING TOOLS

Abrasive Dressing Tool Co., 1550 Broadway, Detroit, Mich. 6 pages, 6×9 , in two colors, giving full information on Abrasive Diamond Dressing Tools.

FLOATING TOOL HOLDERS

W. M. Ziegler Tool Co., Detroit, Mich., 4 pages $8\frac{1}{2} \times 11$, fully describing the features of the Ziegler roller-drive floating tool holder.

CONTINUOUS FILING MACHINE

Continental Machine Specialties, Inc., 1301 S. Washington Ave., Minneapolis, Minn. 4 page, $8\frac{1}{2} \times 11$, two-color broadside giving full information on the File All continuous filing machine with a number of pictures of typical jobs.

AUTOMATIC RIVET SETTER

Chicago Rivet & Machine Co., 1830 So. 54th Ave., Chicago, Ill. 4 pages, 17×22 two-color broadside, presenting full information on the Chicago Quadruple automatic rivet setter.

MASTER TAPPER

The Master Tapper Co., 2 Main St., Belleville, N. J. 4 pages, $8\frac{1}{2} \times 11$, telling all about the Master Tapper.

(New Trade Literature—Continued)

DETROIT THREAD PLUG GAUGES

Detroit Tap & Tool Co., 8432 Butler St., Detroit, Mich. 4 pages, 8½x11 presenting the whole story on the Detroit Cobalt thread plug gauges.

OVER CENTER CLUTCHES

Rockford Drilling Machine Div., Borg-Warner Corp., 202 Catherine St., Rockford, Ill. 4 pages 8½x11, illustrating and describing every detail of the Rockford Over-Center clutches.

PORTABLE ELECTRIC TOOLS

The Van Dorn Electric Tool Co., Towson, Md. 54 pages, 8½x11 in color, presenting the 1938 line of Van Dorn drills, shears, tapper, screw drivers, nut runner, saws, grinders, sanders, polishers, etc.

GEAR FINISHER

Michigan Tool Co., 7171 E. McNichols Rd., Detroit, Mich. 6 pages, 8½x11, giving large scale illustrations and full information on the 860 and Duplex gear finishers.

GAUGE HANDBOOK

Lincoln Park Tool & Gage Co., Lincoln Park, Mich., 28 pages entitled the L. P. Handbook of Gages, giving the types of gages and precision tools made by this Company. Five pages on Carboly cemented-carbide work. Second section covers gage standards.

PUTNAM UNIVERSAL GRINDING FIXTURE

Putnam Tool Co., 2981 Charlevoix Ave., Detroit, Mich. Folder describing the new Putnam Universal Grinding Fixture, designed primarily for sharpening end mills but adaptable for a wide variety of cutting tools.

DIE AND MOLD DUPLICATORS

George Gorton Machine Co., Racine, Wis. 32 pages 8½x11 in color, bulletin 1319-B, showing the three Gorton machines of varying size that are available for duplication of plastic and glass molds, die casting dies, forging dies with many large illustrations and interesting text.

HANNA ENGINEERING WORKS

Hanna Engineering Works, 1765 Elston Ave., Chicago, Ill. Catalog No. 226, 24 pages and cover—8½x11—giving illustrations, capacities, dimen-

sions on the complete line of Hanna cylinders, hoists, valves, etc. presenting a lot of information on pushing, pulling, raising and lowering equipment.

GAS ENGINE DRIVE WELDERS

Hobart Bros., Troy, Ohio, 4 pages, 8½x11 on the Hobart gas engine drive welder and another of the same size on the new heavy duty gas engine drive.

INTRODUCING**The KNU-SINE Universal****TOGGLE CLAMPS**

3 Distinct Sizes

The newest and most feasible method of locating production parts in jigs, fixtures and dies. Toggle unit may be swung through 180 degrees, eliminating work in the Toolroom.

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Sturdy, rigid construction for long life—simple, practical design for dependable service.

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Etchtool —
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Luma Marking and
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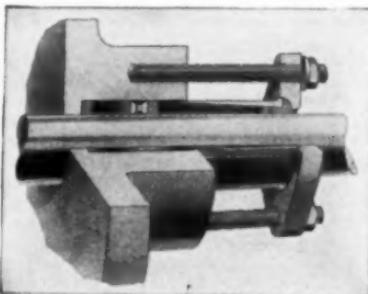
Writes on hardened steel — demagnetizes at the same time—with carbon point does light spot annealing and soldering jobs. Compact—easy to use—dependable.

Send for details—5-day FREE TRIAL OFFER!

Luma Electric Equipment Co.
Dept. H—Main P. O. Box 132, Toledo, Ohio

Conical Self-Aligning Packing Glands

The Crane Packing Co., 1800 Cuyler Ave., Chicago, Ill., offers a new type gland, adapted for ammonia, air and gas compressors, reciprocating pumps and engines. It is claimed that on some jobs which formerly averaged a repack every 30 or 40 days, this packing carried the same compressors 12 months or more.



The gland is made from nickel steel and fine bearing bronze, machine finished inside and out. When installed, it is packed with "John Crane" super-seal split packing inserts moulded to fit the gland. The inner surface of the cup is tapered, which in effect forces the packing around the rod with each stroke of the piston, instead of compressing it in the gland and stuffing box.

It is asserted that leakage and blowby are eliminated, even when machines are idle, and using the "John Crane" split packing inserts, glands may be repacked in a few minutes. The ball and socket construction is said to compensate for "float", present in varying degrees in pumps and compressors—preventing wedging or distortion of the cup where it meets the cast steel follower, if studs are drawn up unequally when the gland is being adjusted.

Each follower bears a serial number, reference to which enables the manufacturer to ship inserts molded

from master cups of the same number, stocked in Chicago. Any size or shape of follower may be obtained to fit existing dimensions or conditions, although the two stud type is generally recommended.

The gland is adaptable for use on both steam and liquid ends of pumps, and the power and compression ends of gas compressors handling cracking coil gases, still gases, Butane, Propane, natural gas, and Ammonia; also in pumps handling asphalt, tar, sludge,

tank bottoms, liquid Propane, Butane, etc. It is said to have served satisfactorily on reciprocating pumps on bottom service, distillate service, reflux service, flash corrector service, high pressure gas compressors and other refinery services where high pressures and temperatures create packing problems.

Complete information and descriptive literature may be had by addressing the manufacturers on your letter-head, mentioning The BLUE BOOK.

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MOTOR DRIVEN, AUTOMATIC



For high speed, dependable spot welding with precision of pressure and accuracy of timing heretofore available only in high priced equipment. Speeds from 40 to 120 spot welds per minute.

Mechanical operation eliminates fatigue, speeds up production and cuts labor costs.

Powered by self contained unit mounted in base, fully enclosed, easily accessible. Controlled by magnetically operated clutch through foot switch attached to flexible cable. Operator's hands free to handle work.

Made in 4 Sizes from 15 to 50 KW. Write for Bulletin MD-120.

For information on foot operated ACE Spot Welders ask for Bulletin 62.

Send Quickmail Coupon No. 28 for full details and prices.

PIER EQUIPMENT MFG. CO.

WELDING EQUIPMENT DIVISION

633 Cross Street,

Benton Harbor, Michigan

Metallizing In The Chicago Territory

Machinists Tool Grinding Co., 3038 Van Buren St., Chicago, Ill., make a specialty of all kinds of Metallizing jobs. Pictures of their equipment were shown in the March BLUE BOOK. They offer rapid, dependable service in the building-up of undersized, worn, scored parts such as shafts; repairing damaged bearings by spraying-in babbit; and application of protective coatings to parts subjected to undue exposure and corrosion. They invite consultation regarding any Metallizing problems.

Teco Tungsten Carbide Chart

Super Tool Co., 356 E. Congress St., Detroit, Mich., announce a handy chart showing the grades of Teco Tungsten Carbide Metal recommended for machining a variety of materials under a



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A watch for every purpose

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Made in 22 standard shapes and 5 standard cuts. Free and fast cutting is insured by careful manufacture and hardening. Send for full information.

The Hamilton Tool Co., Hamilton, O.

number of different conditions. On the reverse is a convenient table of decimal equivalents. The charts are $5\frac{1}{2} \times 8\frac{3}{8}$ -inches, printed in clear, legible type. Copies will be sent free on application to the Super Tool Co.

Binks Portable Spraying Outfits

Six different mounting styles in portable paint spraying compressors are offered by Binks Mfg. Co., 3114 Carroll Ave., Chicago, Ill. A most popular type is the two-wheel hand



cart style, available with steel wheels or pneumatic tires. This style is available for gasoline engine or electric motor drive, in sizes from $1\frac{1}{2}$ to 6 h.p.

For further details, please address the makers — and kindly mention THE BLUE BOOK.

Milling Machine Practice

An interesting and instructive chapter on modern milling machine practice is included in the revised edition of Kent's Handbook. This is the work of Hans Ernst, Director of the Research Dept., Cincinnati Milling Machine and Cincinnati Grinders Inc., and Mario Martellotti, Research Engineer. Reprints of the chapter in the form of a 16-page booklet, are available, and may be had without charge by addressing the Cincinnati Milling Machine Co., Cincinnati, Ohio and mentioning THE BLUE BOOK.

MOTORIZE With STEEGE DRIVES

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Lathes,
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We do broaching and all kinds of grinding.

We specialize in grinding hardened steel bushings, cam rollers, etc.

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Indispensable for Toolroom and Experimental Work. Saves up to 90% on templates and trial blanks.

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1536B Clark St., Racine, Wis.



Write on your letterhead for free shop sample.

Coffing Safety Pull

Termed the most "fool-proof" hoist yet developed, the Safety Pull is offered by Coffing Hoist Co., Danville, Ill., to reduce the hazards of lifting and pulling.

When a load has been elevated and it is desired to lower the hoist, a push button reverses the action. This control also serves as a safety stop if the worker's hand slips off, locking the handle. Two other separate safety stops prevent the handle from whirling around and causing injury.

A new intermediate locking pawl works alternately and intermittently with the main locking pawl, enabling the load to be stopped in locking position at half the length of the regular stroke.

In case of excessive overloads, the safety handle bends before any other part of the hoist will give. This serves as a warning to prevent chain breakage, or hooks from straightening-out and dropping loads.

Coffing Safety Pulls are made for loads of from $\frac{3}{4}$ to 15-tons, and the different models weigh from 14 to 150 lbs. Each hoist is said to be factory tested at 100% overload.

The makers claim that the Safety Pull may be used in any position, with less headroom than any other hoist, and that it is the most compact device of its kind.

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on dies, jigs, fixtures and machined parts.

With the use of die blue layout fluid you do not have to polish the surface of the work. Simply wipe surface fairly clean and brush on. DRIES INSTANTLY.

DAYTON ROGERS MANUFACTURING CO.
MINNEAPOLIS



The MALL Universal Grinder

AFTER ALL

It's Performance That Counts!

Let MALL Flexible Shaft Grinders tell their own story on your grinding, disc sanding, or polishing job! There's a size and model for your particular work.

These powerful, efficient, cost cutting tools will out-perform any other type of equipment. They deliver the maximum horsepower to the working tool with the minimum of weight in the operator's hands.

Ask for a demonstration in your plant — you be the judge!

Send for literature describing the various models.

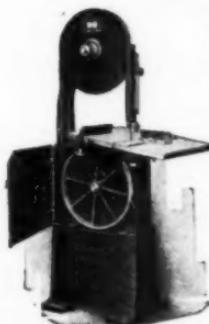
MALL TOOL COMPANY, 7742 South Chicago Ave., CHICAGO, ILLINOIS

Other MALL Products are portable drills, portable saws, planers and mortisers

OFFICES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

The "Oliver" Band Saw Brazer

*makes a joint
as good as
the saw
itself!*



18-INCH BAND SAW

Saws sheet steel with greatest ease. Motor-on-shaft. Operates from light socket. Furnished with low speed motor for heavy cuts. Precision-built.



In a few minutes this Electric Brazer makes a perfect, strong band saw joint as good as the saw itself. Equally efficient on metal and wood cutting saws. Temper is under full control at all times. Simple to operate, and safe too—no shocks, no fire. Price, only \$50.00.

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Recommended by
75 Band Saw makers
and thousands
of operators.

OLIVER MACHINERY COMPANY, Grand Rapids, Michigan

Buyers' Directory

Abrasive Cut-off Machines

Challenge Mch'y. Co., Grand Haven, Mich.
Tannevitz Works, Grand Rapids, Mich.

Air Velocity Meters

Illinois Testing Laboratories, 150 W. Austin Ave., Chicago, Ill.

Angle Plates, Adjustable

McMahon Co., Frank, Dayton, Ohio

Automatics

National Acme Co., Cleveland, Ohio

Balancing Ways

Anderson Bros. Mfg. Co., Rockford, Ill.
Sunstrand Machine Tool Co., Rockford, Ill.

Balling Presses

Galland-Henning Mfg. Co., Milwaukee, Wis.

Band Saw Machines, for Metal

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
Delta Mfg. Co., Milwaukee, Wis.
Grob Bros., Grafton, Wis.
Oliver Machinery Co., Grand Rapids, Mich.
Tannevitz Works, Grand Rapids, Mich.
Wells Mfg. Co., Three Rivers, Mich.

Bear Cutters

Buffalo Forge Company, Buffalo, N. Y.

Belt Lacing

Armstrong-Bry & Co., 315 N. Loomis, Chicago

Belt Sanders

Skilav, Inc., 3304 Elston Ave., Chicago, Ill.

Belts, V-Type

Delta Mfg. Co., Milwaukee, Wis.

Bench Legs, Steel

Standard Pressed Steel Co., Jenkintown, Pa.

Bending Machines, Hand and Power

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
Buffalo Forge Company, Buffalo, N. Y.
Lewthwaite Mch. Co., T. H., 311 E. 47th, N.Y.

Bending Rolls

Buffalo Forge Co., Buffalo, N. Y.
Marshalltown Mfg. Co., Marshalltown, Ia.

Bins

Interior Steel Equipment Co., Cleveland, O.
Stackbin Corp., Providence, R. I.

Blow Guns

Essex Brass Corp., Detroit, Mich.

Blowers, Portable Electric

Breuer Electric Co., 846 Blackhawk St., Chicago
Buffalo Forge Company, Buffalo, N. Y.
Jenents Mfg. Co., 6650 Narragansett, Chicago
General Blower Co., 401 N. Peoria St., Chicago
Skilav, Inc., 3304 Elston Ave., Chicago, Ill.

Bolts and Nuts

Triplex Screw Co., Cleveland, Ohio

Books, Engineering and Technical

Lincol Electric Co., Cleveland, Ohio

Boring Bars

Chicago Tool & Engineering Co., 84th and Clyde Ave., Chicago, Ill.

A. Maxwell Co.

Bedford, Ohio

Tigid Tool Holder Co.

Detroit, Mich.

Russell Boring Bar Co.

Middletown, Ohio

Boring Heads

Riley Mfg. Co., Shillington, Pa.

Tyn Manufacturing Co., Detroit, Mich.

Fickert-Shafer Co., Erie, Pa.

Boring Machines

x-Cell-O Corp., Detroit, Mich.

& L Tools, Philadelphia, Pa.

Rockford Drilling Machine Co., Rockford, Ill.

Brakes, Hand and Power

Rein & Krump Mfg. Co., 7440 So. Loomis Blvd., Chicago, Ill.

Person Allsteel Press Co., 9303 S. Kenwood Ave., Chicago, Ill.

Brazers, Electric

Grob Brothers, Grafton, Wis.
Oliver Machinery Co., Grand Rapids, Mich.

Broaching Machine Tools

Colonial Broach Co., Detroit, Mich.

Broach Sharpening Machines

Colonial Broach Co., Detroit, Mich.

Broaches, Spline and Square

Colonial Bushings Co., Detroit, Mich.

Ex-Cell-O Corp., Detroit, Mich.

Taylor Machine Co., Cleveland, Ohio

Buffers, Bench

Hammond Machinery Builders, Kalamazoo, Mich.
Vonnegut Moulder Corp., Indianapolis, Ind.

Buffers, Pedestal

Vonnegut Moulder Corp., Indianapolis, Ind.

Bulldozers

Beatty Machine & Mfg. Co., Hammond, Ind.

Bushings, Jig

Acme Industrial Co., 210 N. Laflin St., Chicago

Colonial Bushings Co., Detroit, Mich.

Ex-Cell-O Corp., Detroit, Mich.

Bushings, Steel

Acme Industrial Co., 210 N. Laflin St., Chicago

Baumbach Mfg. Co., E. A., 1812 So. Kilbourne Ave., Chicago, Ill.

Universal Eng. Corp., Frankenmuth, Mich.

Cable, Welding

Lincoln Electric Co., Cleveland, Ohio

Calipers

Comet Tools, Inc., 39 Union Square, New York

Scherr Co., George, 122 Lafayette St., N. York

Cams, Alloy Steel

Modern Collet & Machine Co., Ecorse, Mich.

Cams

Banner Mfg. Co., 1873 Clybourn Ave., Chicago

Cap Screws

Triplex Screw Co., Cleveland, Ohio

Centering Machines

Cullman Wheel Co., 1359 Altgeld St., Chicago

Sunstrand Machine Tool Co., Rockford, Ill.

Centers, Lathe

Modern Machine Corp., Brooklyn, N. Y.

Nielsen, Inc., Lawton, Mich.

Rigid Tool Holder Co., Detroit, Mich.

Chains, Silent and Roller

Chicago Gear Works, 760 W. Jackson, Chicago

Cullman Wheel Co., 1359 Altgeld St., Chicago

Chamfering Machines, Automatic

Grant Mfg. & Machine Co., Bridgeport, Conn.

Chaser Grinders

National Acme Co., Cleveland, Ohio

Chasers, High Speed Steel

Rickert-Shafer Co., Erie, Penna.

Chucking Fingers

Modern Collet & Machine Co., Ecorse, Mich.

Morrison Machine Products, Inc., Elmira, N. Y.

Chucking Machines

National Acme Co., Cleveland, Ohio

Chucks

Universal Eng. Corp., Frankenmuth, Mich.

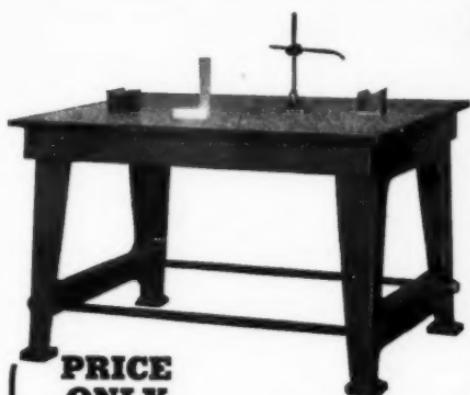
Chucks, Air

Hannifin Mfg. Co., 621 S. Kolmar Ave., Chgo.

Tomkins-Johnson Co., Jackson, Mich.

Chucks, Automatic

Prochner Safety Chuck Co., 14 S. Clinton St., Chicago, Ill.



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Tomkins-Johnson Co., Jackson, Mich.

Chucks, Drill and Tap

Errington Mech. Labor., Staten Island, N. Y.
Etco Tool Co., 504 Johnson Ave., Brooklyn, N. Y.
Hartford Special Mach'y Co., Hartford, Conn.
Nielsen, Inc., Lawton, Mich.
Pronier Safety Chuck Co., 14 S. Clinton St.,
Chicago, Ill.
Scully-Jones & Co., 1905 S. Rockwell, Chicago

Chucks, Lathe

L-W Chuck Co., Toledo, Ohio

Chucks, Magnetic

Brown & Sharpe Mfg. Co., Providence, R. I.

Chucks, Quick Change

Pronier Safety Chuck Co., 14 So. Clinton St.,
Chicago, Ill.

Clamping Devices, Air Operated

Hannifin Mfg. Co., 621 S. Kolmar Ave., Chgo.

Clutches, Friction

Conway Clutch Co., Cincinnati, Ohio
Rockford Drilling Machine Co., Rockford, Ill.

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Morrison Machine Products, Inc., Elmira, N. Y.

Collets for all Lathes and Millers

Hardinge Brothers, Inc., Elmira, N. Y.
Modern Collet & Machine Co., Ecorse, Mich.
Sutton Tool Co., Detroit, Mich.

Universal Eng. Corp., Frankenmuth, Mich.

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Modern Collet & Machine Co., Ecorse, Mich.
Sutton Tool Co., Detroit, Mich.

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Scully-Jones & Co., 1905 S. Rockwell, Chicago

Countersinks

Severance Tool Mfg. Co., Saginaw, Mich.

Couplings, Belt

Armstrong-Bray & Co., 315 N. Loomis, Chicago

Couplings, Compression Shaft

W. H. Nicholson & Co., Wilkes-Barre, Pa.

Couplings, Flexible

Overjoy Flex. Coupling Co., 5026 Lake, Chicago

V. H. Nicholson & Co., Wilkes-Barre, Pa.

Couplings, Friction Clutch

Onway Clutch Co., Cincinnati, Ohio

Couplings, Shaft

V. H. Nicholson & Co., Wilkes-Barre, Pa.

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Miller Machinery Co., Grand Rapids, Mich.
Ann Arbor Works, Grand Rapids, Mich.

Cutter Grinders

Baumbaugh Mfg. Co., Geo., Racine, Wis.

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Progressive Tool & Cutter Co., Ferndale, Mich.
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Tomkins-Johnson Co., Jackson, Mich.

Cutters, Ball Socket

Severance Tool Mfg. Co., Saginaw, Mich.

Cutters, Midget Milling

Severance Tool Mfg. Co., Saginaw, Mich.

Cutters, Milling

Brown & Sharpe Mfg. Co., Providence, R. I.

Ex-Cell-O Corp., Detroit, Mich.

Machinists Tool Grinding Co., 3038 W. Van

Buren St., Chicago, Ill.

Reisinger Mfg. Co., Rochester, N. Y.

Renn Tool Company, Detroit, Mich.

Scully-Jones & Co., 1905 S. Rockwell, Chicago

Cutters, Gear

Michigan Tool Co., Detroit, Mich.

Cutters, Taper Reaming

Severance Tool Mfg. Co., Saginaw, Mich.

Cutters, Tube Burring

Severance Tool Mfg. Co., Saginaw, Mich.

Cylinders, Air

Hanna Engineering Works, 1763 Elston, Chicago

Hannifin Mfg. Co., 621 S. Kolmar, Chicago

Tomkins-Johnson Co., Jackson, Mich.

Decreasers

Detroit Rex Products Co., Detroit, Michigan

Demagnetizers

Luna Electric Equipment Co., Toledo, Ohio

L-W Chuck Co., Toledo, Ohio

Printz Electric Co., Detroit, Mich.

Diamonds

Industrial Diamond Co., Inc., Detroit, Mich.

Diamond Dressings

Industrial Diamond Co., Inc., Detroit, Mich.

Diamond Pointed Tools

Industrial Diamond Co., Inc., Detroit, Mich.

Dies, Automatic Self-Opening

National Acme Company, Cleveland, Ohio

Dies, Blank and Forming

American Tool Works, Inc., Hartford, Conn.

Hamilton Tool Company, Hamilton, Ohio

Dies Casting Machines

Madison-Kipp Corporation, Madison, Wis.

Dies, Cushions, Pneumatic

Dayton Rogers Mfg. Co., Minneapolis, Minn.

Dies, Cushions

Dayton Rogers Mfg. Co., Minneapolis, Minn.

Dies Duplicating Machines

Gorton Machine Co., Geo., Racine, Wis.

Madison-Kipp Corporation, Madison, Wis.

Universal High Speed Tool Co., 549 W. Washington Blvd., Chicago, Ill.

Dies Fliers

Continental Machine Specialties, Minneapolis

Grob Brothers, Grafton, Wis.

Dies Heads, Self Opening

Rickert Shaper Co., Erie, Penna.

Dies Making Machines

Armiglo Co., Milwaukee, Wis.

Continental Machine Specialties, Minneapolis

Grob Brothers, Grafton, Wis.

Harvey Mfg. Co., 161 Grand St., New York

Oliver Instrument Co., Adrian, Mich.

Oliver Machinery Co., Grand Rapids, Mich.

Pratt & Whitney, Hartford, Conn.

Universal High Speed Tool Co., 549 W. Washington Blvd., Chicago, Ill.

Dies Makers' Supplies

Cerro de Pasco Copper Corp., 44 Wall St.,

New York, N. Y.

Dayton Rogers Mfg. Co., Minneapolis, Minn.

Dies Sets

Baumbaugh Mfg. Co., E. A., 1812 So. Kilbourne

Ave., Chicago, Ill.

Dies, Hole Punching

Strippit Corp., Buffalo, N. Y.

Dies, Notching

Strippit Corp., Buffalo, N. Y.

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 Standard Gage Co., Poughkeepsie, N. Y.
 United Precision Products Co., 4018 W. Huron
 St., Chicago, Ill.

Gages, Pressure
 Marshalltown Mfg. Co., Marshalltown, Ia.

Gages, Special
 Ford Motor Co., Johansson Div., Dearborn, Mich.
 Standard Gage Co., Poughkeepsie, N. Y.

Gages, Taper
 Hartford Special Machinery Co., Hartford, Conn.

Gage Blocks, Precision
 Ford Motor Co., Johansson Div., Dearborn, Mich.

Gears
 Abart Gear & Mfg. Co., 4832 W. 16th St., Chgo.
 Chicago Gear Works, 780 W. Jackson, Chicago
 Taylor Machine Co., Cleveland, Ohio

Generators
 Chicago Electric Co., 1330 W. Cermak Rd., Chgo.
 Janette Mfg. Co., 552 W. Monroe St., Chicago

Grease Cups
 Essex Brass Corp., Detroit, Mich.

Grinders, Air
 M-B Products, Detroit, Mich.
 Madison-Kipp Corporation, Madison, Wis.
 Onsrud Machine Works, Inc., 3906 Palmer St.,
 Chicago, Ill.

Grinders, Bench
 Baldor Electric Co., St. Louis, Mo.
 Hammond Machinery Builders, Kalamazoo, Mich.
 Vonnegut Moulder Corp., Indianapolis, Ind.

Grinders, Disc
 Oliver Machinery Co., Grand Rapids, Mich.
 Wyzebeck & Staff, Inc., 838 W. Hubbard, Chgo.

Grinders, Electric
 Chicago Wheel & Mfg. Co., 1101 W. Monroe St.,
 Chicago, Ill.

Grinders, External
 F. A. Maxwell Co., Bedford, Ohio

Grinders, Flexible Shaft
 Haskins Co., R. G., 4654 Fulton St., Chicago
 Mall Tool Co., 7742 S. Chicago Ave., Chicago
 N. A. Strand & Co., 5001 N. Wolcott, Chicago

Grinders, Hand
 Chicago Wheel & Mfg. Co., 1101 W. Monroe St.,
 Chicago, Ill.

M-B Products Co., Detroit, Mich.

Skilaw, Inc., 3304 Elston Ave., Chicago, Ill.

Grinders, Heavy Duty
 Vonnegut Moulder Corp., Indianapolis, Ind.

Grinders, High Speed
 Bridgeport Pattern & Model Works, Bridgeport,
 Conn.

Chicago Wheel & Mfg. Co., 1101 W. Monroe
 St., Chicago, Ill.

Mall Tool Co., 7742 S. Chicago Ave., Chicago
 M-B Products, Detroit, Mich.

Universal High Speed Tool Co., 540 W. Wash-
 ington Blvd., Chicago, Ill.

Grinders, Internal
 F. A. Maxwell Co., Bedford, Ohio

Grinders, Pedestal Electric
 Baldor Electric Co., St. Louis, Mo.

Grinders, Swing Frame
 Vonnegut Moulder Corp., Indianapolis, Ind.

Grinders, Valve
 F. A. Maxwell Co., Bedford, Ohio

Grinders and Polishers, Belt
 Oliver Machinery Co., Grand Rapids, Mich.

Grinding Attachments, Drill
 Atlas Press Co., Kalamazoo, Mich.
 Carlson Mfg. Co., C. H., Minneapolis, Minn.
 Oliver Instrument Co., Adrian, Mich.

Grinding, Centerless (Contract)
 Commercial Centerless Grinding Co., 6538 Car-
 negie Ave., Cleveland, Ohio
 Ertel Machine Co., Indianapolis, Ind.
 Machinists Tool Grinding Co., 3038 W. Van
 Buren, Chicago, Ill.

Grinding Machine Attachments
 Berkeley Engineering Co., Cleveland, Ohio

Grinding Machines, Belt
 Armco Co., Milwaukee, Wis.
 Walls Sales Corp., 90 Warren St., New York

Grinding Machines, Cutter, Reamer and Tool
 Brown & Sharpe Mfg. Co., Providence, R. I.
 Gallmeyer & Livingston Co., Grand Rapids,
 Mich.
 National Machine Tool Co., Racine, Wis.
 Oliver Instrument Co., Adrian, Mich.
 Prosser & Son, 120 Wall St., New York, N. Y.
 Rogers & Co., Buffalo, N. Y.

Grinding Machines, Drill
 Black Diamond Saw & Machine Works, Inc.,
 Natick, Mass.
 Gallmeyer & Livingston Co., Grand Rapids,
 Michigan
 Oliver Instrument Co., Adrian, Mich.

Grinding Machines, Floor
 Hammond Machinery Builders, Kalamazoo, Mich.

Grinding Machines, Internal
 Chicago Tool & Engineering Co., 84th and Clyde
 Ave., Chicago, Ill.
 National Machine Tool Co., Racine, Wis.
 Onsrud Machine Works, Inc., 3906 Palmer St.,
 Chicago, Ill.

Grinding Machines, Portable Electric
 Chicago Tool & Engineering Co., 84th and Clyde
 Ave., Chicago, Ill.
 Chicago Wheel & Mfg. Co., 1101 W. Monroe
 St., Chicago, Ill.
 Haskins Co., R. G., 4654 W. Fulton, Chicago
 Mall Tool Co., 7742 S. Chicago Ave., Chicago
 National Machine Tool Co., Racine, Wis.
 Pratt & Whitney, Hartford, Conn.
 Strand Co., N. A., 5001 N. Wolcott St., Chicago

Grinding Machines, Surface
 Gallmeyer & Livingston Co., Grand Rapids,
 Mich.

Grinding Machines, Tap
 Gallmeyer & Livingston Co., Grand Rapids,
 Mich.

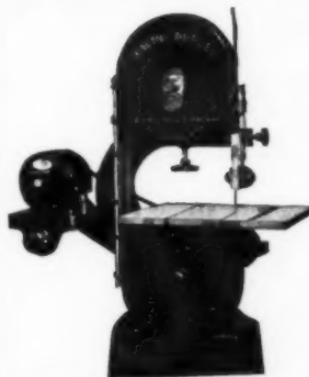
Grinding Machines, Tool
 Hammond Machinery Builders, Kalamazoo, Mich.
 Prosser & Son, 120 Wall St., New York, N. Y.
 Rogers & Co., Buffalo, N. Y.

Grinding Machines, Universal
 Brown & Sharpe Mfg. Co., Providence, R. I.

Grinding Service
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Grinding Spindles
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Hack Saw Blades
Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
Simonds Saw & Steel Co., Fitchburg, Mass.

Hack Saw Machines
Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
L-W Chuck Co., Toledo, Ohio
Wells Mfg. Corp., Three Rivers, Mich.

Hammers, Riveting
High Speed Hammer Co., Rochester, N. Y.

Hammers, Soft Faced
Greene Tweed & Co., 100 Duane St., New York

Hand Saws, Portable Electric
Skilsaw, Inc., 3304 Elston Ave., Chicago, Ill.

Hand Screw Machines, Precision
Hardinge Brothers, Inc., Elmira, N. Y.

Heads, Boring
Flynn Manufacturing Co., Detroit, Mich.

Hobs
Michigan Tool Co., Detroit, Mich.

Hole Cutters
Wyzeneck & Staff, Inc., 838 W. Hubbard, Chgo.

Hollow Screws
Brighton Screw & Mfg. Co., Cincinnati, O.
Standard Pressed Steel Co., Jenkintown, Pa.

Index Centers
Brown & Sharpe Mfg. Co., Providence, R. I.
Wm. Carroll & Son, Norwood, Cincinnati, Ohio
L-W Chuck Co., Toledo, Ohio

Indicators, Dial
Federal Products Corp., Providence, R. I.
Standard Gage Co., Inc., Poughkeepsie, N. Y.

Indicators, Speed
Greene Tweed & Co., 100 Duane St., New York

Indicators, Surface Test
Reich Mfg. Co., J. H., Dayton, Ohio

Jigs and Fixtures
American Tool Works, Inc., Hartford, Conn.
Hamilton Tool Company, Hamilton, Ohio
Hartford Special Machinery Co., Hartford, Conn.
Niewek Tool Co., Detroit, Mich.

Keyseating Machines
Burr & Son, John T., Brooklyn, N. Y.

Knife Grinders
Rogers & Co., Buffalo, N. Y.

Lathe Centers
Modern Machine Corp., Brooklyn, N. Y.
Nielsen, Inc., Lawton, Mich.
Rigid Tool Holder Co., Detroit, Mich.
Sturdimatic Tool Co., Detroit, Mich.

Lathe Drives
Berkeley Engineering Co., Cleveland, Ohio
Culman Wheel Co., 1350 Altgeld St., Chicago
Hardinge Brothers, Inc., Elmira, N. Y.

Lathe, Back Geared
Atlas Press Co., Kalamazoo, Mich.
Rivett Lathe & Grinder, Inc., Brighton, Boston
South Bend Lathe Works, South Bend, Ind.

Lathes, Bench
Ames Co., Waltham, Mass.
Atlas Press Co., Kalamazoo, Mich.
Delta Mfg. Co., Milwaukee, Wis.
Hardinge Brothers, Inc., Elmira, N. Y.
Rivett Lathe & Grinder, Inc., Brighton, Boston
Sheldon Machine Co., 3257 Cottage Grove Ave., Chicago, Ill.
South Bend Lathe Works, South Bend, Ind.

Lathes, Brake Drum
South Bend Lathe Works, South Bend, Ind.

Lathes, Engine
South Bend Lathe Works, South Bend, Ind.
Western Machine Tool Works, Holland, Mich.

Lathes, Manufacturing
Sundstrand Machine Tool Co., Rockford, Ill.

Lathes, Polishing and Buffing
Hammond Machinery Builders, Kalamazoo, Mich.

Lathes, Screw Cutting
Atlas Press Co., Kalamazoo, Mich.
Hardinge Brothers, Inc., Elmira, N. Y.
South Bend Lathe Works, South Bend, Ind.

Lathes, Speed
Schauer Machine Co., Cincinnati, Ohio

Lathes, Toolroom
Atlas Press Co., Kalamazoo, Mich.
South Bend Lathe Works, South Bend, Ind.

Lathes, Turret
Warner & Swasey Company, Cleveland, Ohio

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Dayton Rogers Mfg. Co., Minneapolis, Minn.
Michigan Chrome Company, Detroit, Mich.

Layout Plates
Challenge Machinery Co., Grand Haven, Mich.

Layout Tables
J. C. Busch, Milwaukee, Wis.

Leader Pins, Steel
Acme Industrial Co., 210 Laflin St., Chicago, Ill.

Leather Oil Retainers
Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

Live Lathe Centers
Modern Machine Corp., Brooklyn, N. Y.
Sturdimatic Tool Co., Detroit, Mich.

Lubricators, Air
Essex Brass Corp., Detroit, Mich.
Norgren, C. A., Denver, Colorado

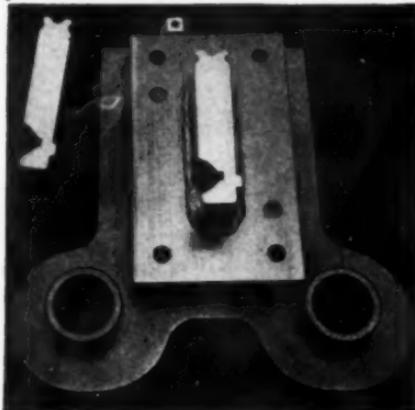
Lubricators, Automatic
Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago
Greene Tweed & Co., 100 Duane St., New York
Madison-Kipp Corporation, Madison, Wis.
M-B Products Co., Detroit, Mich.
Norgren Co., C. A., Denver, Colorado

Lubricators, Engine
Madison-Kipp Corporation, Madison, Wis.

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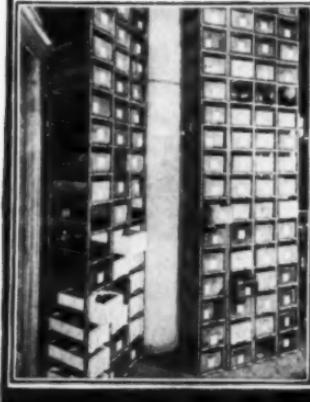
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Burke Machine Tool Co., Conneaut, Ohio

Wm. Carroll & Son, Norwood, Cincinnati, Ohio
Universal High Speed Tool Co., 549 W. Washington Blvd., Chicago, Ill.

Milling Machine Attachments

Berkeley Engineering Co., Cleveland, Ohio

Milling Machines, Bench

Ames Co., Waltham, Mass.

Burke Machine Tool Co., Conneaut, Ohio

Hardinge Brothers, Inc., Elmira, N. Y.

Sundstrand Machine Tool Co., Rockford, Ill.

Milling Machines, Hand

Burke Machine Tool Co., Conneaut, Ohio

Sundstrand Machine Tool Co., Rockford, Ill.

Milling Machines, Plain

Brown & Sharpe Mfg. Co., Providence, R. I.

Burke Machine Tool Co., Conneaut, Ohio

Sundstrand Machine Tool Co., Rockford, Ill.

Milling Machines, Universal

Brown & Sharpe Mfg. Co., Providence, R. I.

Gorton Machine Co., Geo., Racine, Wis.

Milling Machines, Vertical

Gorton Machine Co., Geo., Racine, Wis.

Motors

Chicago Electric Co., 1330 W. Cermak Rd., Chgo.

Janette Mfg. Co., 552 W. Monroe St., Chicago

Motor-Generator Sets

Chicago Electric Co., 1330 W. Cermak Rd., Chgo.

Janette Mfg. Co., 552 W. Monroe St., Chicago

Motor Drives, Universal

Berkeley Engineering Co., Cleveland, Ohio

Cullman Wheel Co., 1339 Altgeld St., Chicago

Steege Machinery Co., 18 S. Clinton St., Chgo.

Turner Uni-Drive Co., Kansas City, Mo.

Motor Starters

Lincoln Electric Co., Cleveland, Ohio

Moulds & Ladies, Hammer and Vise

Johnson Tool Co., East Providence, R. I.

Multiple Oilers

Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

Nibbling Machines

National Machine Tool Co., Racine, Wis.

Nitrided Products

Universal Eng. Corp., Frankenmuth, Mich.

Oil Cups

Essex Brass Corp., Detroit, Mich.

Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

Oil Gauges

Essex Brass Corp., Detroit, Mich.

Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

Oil and Grease Seals

Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

Packings, Steam

Greene Tweed & Co., 100 Duane St., New York

Pins, Leader and Dowel

Acme Industrial Co., 210 Laflin St., Chicago, Ill.

Baumbach Mfg. Co., E. A., 1812 So. Kilbourne Ave., Chicago, Ill.

Pipe Cutters

Ridge Tool Co., Elyria, Ohio

Pipe Vises

Ridge Tool Co., Elyria, Ohio

Pipe Wrenches

Ridge Tool Co., Elyria, Ohio

Plug Gauges

United Precision Products Co., 4618 W. Huron St., Chicago, Ill.

Point Thinning Machines

Oliver Instrument Co., Adrian, Mich.

Press Brakes

Dreis & Krump Mfg. Co., 7440 Loomis Blvd., Chicago, Ill.

Verson Allsteel Press Co., 9303 S. Kenwood Ave., Chicago, Ill.

Press Feeds

Littell Machine Co., F. J., 4153 Ravenswood Ave., Chicago, Ill.

Wittke Mfg. Co., 4300 W. 24th Place, Chicago

Presses, Arbor

Atlas Press Co., Kalamazoo, Mich.

Famco Machine Co., Racine, Wis.

Greenard Arbor Press Co., Nashua, N. H.

Hanna Engineering Works, 1762 Elston, Chicago

Hannifin Mfg. Co., 621 S. Kolmar Ave., Chgo.

W. H. Nicholson & Co., Wilkes-Barre, Pa.

Sheldon Machine Co., 3257 Cottage Grove Ave., Chicago, Ill.

Tomkins-Johnson Co., Jackson, Mich.

Wilson, K. R., Buffalo, N. Y.

Presses, Bench

Atlas Press Co., Kalamazoo, Mich.

Presses, Broaching

Greenard Arbor Press Co., Nashua, N. H.

Presses, Extruding

Beatty Machine & Mfg. Co., Hammond, Ind.

Presses, Foot

Famco Machine Co., Racine, Wis.

Presses, Forming

Marshalltown Mfg. Co., Marshalltown, Ia.

Presses, Hydraulic

Atlas Press Co., Kalamazoo, Mich.

Beatty Machine & Mfg. Co., Hammond, Ind.

Hannifin Mfg. Co., 621 S. Kolmar Ave., Chgo.

Presses, Inclining

Federal Press Co., Elkhart, Indiana.

Marshalltown Mfg. Co., Marshalltown, Ia.

Presses, Power

Dreis & Krump Mfg. Co., 7440 Loomis Blvd., Chicago, Ill.

Federal Press Co., Elkhart, Indiana

Verson Allsteel Press Co., 9303 S. Kenwood Ave., Chicago, Ill.

Presses, Punch

Dreis & Krump Mfg. Co., 7440 Loomis Blvd., Chicago, Ill.

Lewthwaite Mch. Co., T. H., 311 E. 47th, N.Y.

Marshalltown Mfg. Co., Marshalltown, Ia.

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Pulleys, Steel and Wood

Delta Mfg. Co., Milwaukee, Wis.

Pulleys, Vacuum Cup

Vacuum Cup Metal Pulley Co., Detroit, Mich.

PumpsBrown & Sharpe Mfg. Co., Providence, R. I.
Galland-Henning Mfg. Co., Milwaukee, Wis.**Pumps, Coolant**Ruthman Machinery Co., Cincinnati, Ohio
Tomkins-Johnson Co., Jackson, Mich.**Pumps, Lubricant**

Ruthman Machinery Co., Cincinnati, Ohio

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Lewthwaite Mch., T. H., 311 E. 47th, N.Y.
Whitney Metal Tool Co., Rockford, Ill.**Punches, Multiple**

Beatty Machine & Mfg. Co., Hammond, Ind.

Punches, Power

Beatty Machine & Mfg. Co., Hammond, Ind.

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Pyrometer Instrument Co., 102-105 Lafayette St., New York City

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Pyrometer Instrument Co., 102-105 Lafayette St., New York City**Pyrometers, Surface**Illinois Testing Laboratories, Inc., 150 West Austin Ave., Chicago, Ill.
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Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.

Riveters, Automatic Feed

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.

Riveters, "Hy-Power" Hydraulic

Hannifin Mfg. Co., 621 S. Kolmar Ave., Chgo.

Riveters, Multiple Spindle

Grant Mfg. & Machine Co., Bridgeport, Conn.

Riveters, PneumaticGrant Mfg. & Machine Co., Bridgeport, Conn.
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Lewthwaite Mch., T. H., 311 E. 47th, N.Y.

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Putnam Tool Co., Detroit, Mich.

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Haskins Co., R. G., 4654 W. Fulton, Chicago

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National Acme Company, Cleveland, Ohio

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Safety Socket Screw Corp., 4440 N. Knox Ave., Chicago, Ill.
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Triplex Screw Co., Cleveland, Ohio

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Delta Mfg. Co., Milwaukee, Wis.

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American Hollow Boring Co., Erie, Pa.

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Atlas Press Co., Kalamazoo, Mich.
Western Machine Tool Works, Holland, Mich.

Shaping Machines

Osborne & Sexton Machinery Co., Columbus, O.
Western Machine Tool Works, Holland, Mich.

Shears, Bevel

Marshalltown Mfg. Co., Marshalltown, Ia.

Shears, Hand

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
Beverly Shear Co., 3007 W. 110th Pl., Chicago
Lewthwaite Mfg. Co., T. H. 311 E. 47th, N.Y.
National Machine Tool Co., Racine, Wis.
Whitney Metal Tool Co., Rockford, Ill.

Shears, Power

Beatty Machine & Mfg. Co., Hammond, Ind.
Buffalo Forge Co., Buffalo, N. Y.
Dreis & Krump Mfg. Co., 7440 Loomis, Chicago

Shears, Slitting

Beverly Shear Co., 3007 W. 110th Pl., Chicago
Buffalo Forge Co., Buffalo, N. Y.
Dreis & Krump Mfg. Co., 7400 Loomis, Chicago
National Machine Tool Co., Racine, Wis.

Shears, Splitting

Marshalltown Mfg. Co., Marshalltown, Ia.

Shears, Throatless

Beverly Shear Co., 3007 W. 110th Pl., Chicago
Marshalltown Mfg. Co., Marshalltown, Ia.

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Interior Steel Equipment Co., Cleveland, Ohio

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Sine Tables

Robbins Engineering Co., Detroit, Mich.

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Culiman Wheel Co., 1359 Altgeld St., Chicago
Janette Mfg. Co., 532 W. Monroe St., Chicago

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Jarvis Co., Charles L., Middletown, Conn.
Procurier Safety Chuck Co., 14 So. Clinton St., Chicago, Ill.

Rickert-Shafer Co., Erie, Penna.

Western Machine Tool Works, Holland, Mich.
Whitney Metal Tool Co., Rockford, Ill.

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Rickert-Shafer Co., Erie, Penna.

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Tools, Boring

Armstrong Bros. Tool Co., 308 N. Francisco Av., Chicago, Ill.
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Bennet-Rafkin Machine Tool Corp., 30 Church St., New York, N. Y.

Bernstein & Co., Geo. M., 12 S. Clinton, Chgo.
Blank Machinery, Jackson, Mich.

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Easley Machinery Co., E. L., 831 W. Evergreen Ave., Chicago, Ill.

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Falk Mill Supply Co., Inc., Rochester, N. Y.

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Hackett, J. Lee, Detroit, Mich.

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Miles Machinery Co., Saginaw, W. S., Mich.

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Norton-Broadway Machinery Co., Cincinnati, O.
Nutmeg State Mch. Corp., New Haven, Conn.

O'Brien Machinery Co., Philadelphia, Pa.
Ohio Machinery & Supply Co., Cincinnati, Ohio

Osborne & Sexton Machinery Co., Columbus, O.
Ott Machinery Sales Co., Detroit, Mich.

Prutton Machinery Co., D. H., Cleveland, Ohio
Queen City Electric Co., 515 S. California Ave., Chicago, Ill.

Reliance Machinery Sales Co., Pittsburgh, Pa.

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 Scott-Bansbach Mchly. Co., 4607 W. 20th, Chgo.
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 Simmonds Machine Tool Corp., Albany, N. Y.
 Standard Machinery Co., Grand Rapids, Mich.
 Strong, Carlisle & Hammond Co., Cleveland, O.
 Surplus Stock & Mchly. Co., Inc., 618 W. Lake St., Chicago, Ill.
 United Machinery & Supply Co., St. Louis, Mo.
 Victor Machinery Co., 130 S. Clinton, Chicago
 Victor Machinery Exchange, 251 Centre St., New York, N. Y.
 Vine, R. A., Detroit, Mich.
 Wain Mchly. Sales, Chas. E., Detroit, Mich.
 Wertman Machinery Co., Cleveland, Ohio
 West Penn Machinery Co., Pittsburgh, Pa.
 White Mchly. Co., A. D., 108 N. Jefferson, Chgo.
 Wigglesworth Machinery Co., Cambridge, Mass.
 Wolnick Mchly. Sales, 9 S. Clinton St., Chicago

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Breuer Electric Co., 846 Blackhawk St., Chgo.

Vacuum Cleaners, Portable

Breuer Electric Co., 846 Blackhawk St., Chgo.

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 Galland-Henning Mfg. Co., Milwaukee, Wis.
 Hanna Engineering Works, 1763 Elston, Chicago
 Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago
 Nicholson & Co., Wilkes-Barre, Penna.
 Ross Operating Valve Co., Detroit, Mich.

Valves

Galland-Henning Mfg. Co., Milwaukee, Wis.
 Hanna Engineering Works, 1763 Elston, Chicago
 Ross Operating Valve Co., Detroit, Mich.

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 Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago
 Nicholson & Co., W. H. Wilkes-Barre, Pa.
 Ross Operating Valve Co., Detroit, Mich.

Valves, Hydraulic

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 Hanna Engineering Works, 1763 Elston, Chicago
 Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago
 Nicholson & Co., Wilkes-Barre, Penna.

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 Hanna Engineering Works, 1763 Elston, Chicago
 Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago
 Ross Operating Valve Co., Detroit, Mich.
 Tomkins-Johnson Co., Jackson, Mich.

Vises, Drilling Machine

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
 Armstrong Bros. Tool Co., 308 N. Francisco Av., Chicago, Ill.
 Chicago Tool & Engineering Co., 84th and Clyde Ave., Chicago, Ill.
 Johnson Tool Co., Inc., East Providence, R. I.
 Knu-Vise Products Co., Detroit, Mich.
 L-W Chuck Co., Toledo, Ohio
 Martin Tool & Die Works, J. E., Springfield, O.
 National Machine Tool Co., Racine, Wis.
 Odin Universal Corp., 110 S. Dearborn, Chicago
 Plunket Machine Co., 1823 W. Lake St., Chicago
 Sheldon Machine Co., 3257 Cottage Grove, Chgo.
 Yost Mfg. Co., Meadville, Penna.

Vises, Machinists'

Knu-Vise Products Co., Detroit, Mich.
 L-W Chuck Co., Toledo, Ohio

Miller & Crowningshield, Greenfield, Mass.
 Odin Universal Corp., 110 S. Dearborn, Chicago
 Sheldon Machine Co., 3257 Cottage Grove, Chgo.
 Western Tool & Mfg. Co., Springfield, Ohio
 Yost Mfg. Co., Meadville, Penna.

Vises, Milling Machine

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 L-W Chuck Co., Toledo, Ohio
 Miller & Crowningshield, Greenfield, Mass.
 Odin Universal Corp., 110 S. Dearborn, Chicago
 Plunket Machine Co., 1823 W. Lake St., Chicago
 Sheldon Machine Co., 3257 Cottage Grove, Chgo.
 Yost Mfg. Co., Meadville, Penna.

Vises, Precision

Odin Universal Corp., 110 S. Dearborn, Chicago

Vises, Shaper

L-W Chuck Co., Toledo, Ohio
 Odin Universal Corp., 110 S. Dearborn, Chicago
 Plunket Machine Co., 1823 W. Lake St., Chicago
 Sheldon Machine Co., 3257 Cottage Grove, Chgo.

Welders, Arc

Hobart Brothers, Troy, Ohio
 Lincoln Electric Co., Cleveland, Ohio
 Pier Equipment Mfg. Co., Benton Harbor, Mich.

Welders, Portable

Hobart Brothers, Troy, Ohio

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 Lincoln Electric Co., Cleveland, Ohio

Welding Electrodes and Holders

Hobart Brothers, Troy, Ohio
 Lincoln Electric Co., Cleveland, Ohio

Welding Generators, Arc

Hobart Brothers, Troy, Ohio
 Lincoln Electric Co., Cleveland, Ohio

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Armco Co., Milwaukee, Wis.
 Eisler Engineering Co., Inc., Newark, N. J.
 Interstate Machinery Co., Chicago, Ill.
 Pier Equipment Mfg. Co., Benton Harbor, Mich.

Welding Machines and Equipment, E. I. Arc

Hobart Brothers, Troy, Ohio
 Lincoln Electric Co., Cleveland, Ohio
 Pier Equipment Mfg. Co., Benton Harbor, Mich.

Welding Machines, Resistance

Armco Co., Milwaukee, Wis.
 Eisler Engineering Co., Inc., Newark, N. J.
 Lincoln Electric Co., Cleveland, Ohio
 Pier Equipment Mfg. Co., Benton Harbor, Mich.

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Armstrong-Bray & Co., 315 N. Loomis, Chicago

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Lathe, turret, Acme 3" complete	195
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Grinder, disc, No. 50 Gardner m. d.	Tappers, (5) Webster & Perks 8
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Drill, 20" Barnes 4 spdl. all geared, No. 3 m. t.	Drill, 20" Barnes 4 spdl. all geared, No. 3 m. t.
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- 4" American Triple Geared Plain, m.d., gear box
- 4" Hammond Sensitive, belt
- 4" Morris Plain, gear box, m.d.
- 5" American Triple Geared Plain, gear box
- 5" Cincinnati Blackford Universal, m.d.
- 6" Fosdick Economax, m.d. thru gear box on arm, 18" column, p.r.t., latest mechanical type
- 7" Fosdick, cone

MILLING MACHINES

- No. 2A Brown & Sharpe Universal, m.d., taper spindle
- No. 2 Brown & Sharpe Universal, cone
- No. 2 Cincinnati Universal, cone
- No. 2 Rockford Universal, s.p.d.
- Ingersoll Vertical, m.d., 40" rotary table
- No. 2K Type Milwaukee Vertical, m.d., dial feed, Timken Bearings
- No. 4B Becker Vertical, cone
- No. 22 Garvin Vertical, s.p.d.
- No. 2, 3, 4 Cincinnati Plain, s.p.d., flanged spindle
- No. 1, 2 Cleveland Plain, s.p.d.
- No. 1 1/2, 2, 3, 4 Cincinnati Plain, cone
- No. 4 Kempsmith Plain MaxiMill, m.d., late
- No. 13B Brown & Sharpe Plain, taper spindle National Standard, late
- 48" Oesterlein Tilted Offset, m.d., National Standard Spindle, Timken Bearings, late
- 18", 24", 48" Cincinnati Automatics, plain and duplex types, late
- No. 33 Kempsmith Mfg., s.p.d.

PUNCHES & SHEARS

- No. 3 Hilles & Jones Single End
- Cleveland Model EF S.E., 36" throat
- Cleveland EF Double End, 48" throat
- Cleveland EF D.E., 36" throat
- Ryerson No. 4CNC D.E. Coping & Notching Machine

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Cincinnati, Ohio

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 Kearney & Trecker No. 1½-B, No. 1-B, No. 2-A Pl. Miller, dbl. overarm, S. P. D.
 Brown & Sharpe No. 3-B Plain Miller, S. P. D.
 No. 2-A Warner & Swasey Universal Turret Lathe, S. P. D.
 No. 3-A Warner & Swasey Universal Turret Lathe, S. P. D.
 20x10 Rockford Q. C. G. Lathe, cone driven.
 18x8 Monarch Motor Driven Geared Head Lathe, with taper attachment.
 16x6 Pratt & Whitney Lathe, with taper attachment.
 Gardner 26" Motor Driven Double Disc Grinder.
 Bliss, Toledo, and Pexto Punch Presses, Nos. 2, 3, and 4, O. B. I.
 20" Cincinnati Back Geared Crank Shaper, arranged for motor drive.
 16" Kelley Back Geared Crank Shaper.
 No. 2 Landis Universal Grinder.
 25-Tons Baumbach and Danley Leader Pin Die Sets.
 Nos. 00, 0, and 2 Brown & Sharpe Automatic Screw Machines.

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 DRILL, Radial, 3" American Motor on Arm.
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 DRILL, 4-Spindle No. 2 Leland-Gifford 12" ovhg.

LATHE, 30" x 10' Reed Prentice Motor Drive.
 MILLS, Nos. ½, ½A and 2B Kearney & Trecker.
 MILLS, Nos. 2 and 3 B. & S. Vertical Motor Drive.
 MILLS, Nos. 2B, 3B Brown & Sharpe S. P. D.
 MILL, No. 3 GH Hendey Universal.

SPECIAL

No. 6 Grd. Hd. W. & S. Tur. Lathes, M. D.
 Nos. 1A & 2A W. & S. Tur. Lathes, M. D.
 No. 6 Bliss O. B. I., M. D., Air Cushion.
 No. 8E Bliss Double Crank Press, 12" stroke, 48x108, Motor Drive with motor.

60" x 60" x 12' N. B. P. Planer Box Table.
 36" x 36" x 14' Liberty Planer Box Table.
 No. 16 Blanchard Rotary Surf. Grinder.

DRILL, 4-Spindle Allen No. 2 MT 15".
 GRINDER, 33 No. Abrasive Surface, Motor Drive.
 GRINDER, No. 70 Heald Duplex, Internal.
 GRINDER, Nos. 70 and 75 Heald Internal.
 LATHE, 18" x 6' Monarch Geared Head Motor Dr.
 LATHE, 16" x 6' and 18" x 8' Hendey S. P. D.

MILLS, 18" and 24" Cincinnati Plain and Duplex.
 MILLS, Rotary, Nos. 1 and 2 Craftsman.
 OIL GROOVER, Wicaco.
 PRESSES, Various sizes, types (35).
 SHAPER, 20" Columbia Gear Box Motor Drive.
 WELDER, 100 & 150 KW Projection, Motor Drive.

And a complete stock of up-to-date rebuilt equipment

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 - 2 1/2" bar, N.B.P. knee, A. C., M. D.
 - 3" bar, Defiance No. 5, table.
 - 3 1/2" Landis, No. 35, Floor.
 - 4" bar, Gisholt, Knee M/D.
 - 5" bar, Niles Floor Type.
- BORING MILLS, Vertical**
 - 5 1/2" Bullard, Cone Drive
 - 5 1/2" Bullard, P.R.T., M/D.
 - 6" Colburn, P. R. T.
 - 9 1/2" Niles, P. R. T.
- DRILLS, Radial**
 - 6' Cinci. Bickford motor on arm Super Service 17" column.
 - 6' Reed-Prentice Gear Box M. D.
 - 4", 5" & 6" American, Tri. Grd.
 - 4" & 5" Amer. Triple Purpose.
 - 6" American, univ. & plain, (2).
 - 3" and 6" Muellers Gear Box Drive.
 - 3" American, sensitive, tapping.
 - 2, 4 & 6 spindle Allens.
 - 4 spindle Kokomo, 12 1/2" overhang.
 - 24" & 20" Barnes, Weigel, Rockford etc.
 - 32" Cinci. Bickford, Tapping, M.D.
- GRINDERS**
 - 8" Heald rotary Surface No. 200.
 - No. 2 Fraser Univer. 10"x30".
 - 10"x36" Landis Plain (3).
 - 12"x32" No. 2 Landis Univ.
 - 12"x36" Landis Plain.
 - 16"x50" Norton Self Cont.
 - 26"x96" Landis Self Cont.
 - 26"x120" Landis Self Cont.
 - 48" Badger face, Hyd. Feed.
 - No. 2 Diamond 36"x12".
 - 84"x12" Diamond Surface.
 - No. 11 Landis Tool & Cutter.
 - No. 55, 60 and 65 Heald Cylinder.
 - No. 70 Heald Internal.
 - 53" Besley Vert. Spin. Disc.
 - 14" P & W Surface M. D.
 - No. 2 B. & S. Surface M. D.
 - No. 13 B. & S. universal.
 - No. 103 River Internal.
- LATHES**
 - 16"x12" South Bend.
 - 18"x8" Reed Prentice grd. hd.
 - 18"x8" Lodge & Shipley, Cone.
 - 18 3/4"x8" Fay Scott Gap.
 - 22 1/4"x8" Lodge & Shipley, Cone.
 - 24"x12" Putnam Q. C. G., Cone.
 - 24"x12" LeBlond, Cone.
 - 24"x16" Lodge & Shipley, Cone.
 - 24"x19" American L. C. G.
 - 28"x17" Chard, Grd. Hd.
 - 30"x12" S. & B Cone, T. A.
 - 32"x22" Schumacher Boye.
 - 36"x30" N.B.P. Grd. Hd., M. D.
 - 60"x23" Putnam, Cone.
 - 60"x30" Pittsburgh Grd. Hd.
- MILLERS, Production**
 - 4" Pratt & Whitney Spline.
 - 8" & 12" Pratt & Whitney.
 - 28" Cincinnati Semi Automatic.
 - No. 7H Becker.

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 - No. 5 B & S oversize table M. D.
 - Model CS. Becker Continuous.
 - Model B Becker, feeds 36x14x15, spd.
 - No. 5B Becker, Cone. No. 2 Knight.
- MILLERS, Plain**
 - No. 3 Cinci. Univ. Grd. Hd. M/D
 - No. 1 1/2 Garvin Univ. Cone
 - No. 5 Cinci. Grd. Hd., P.R.T.
 - No. 4G LeBlond, Geared Head.
 - No. 3B Heavy B & S Geared Head.
 - No. 3G Hendey, Geared Head.
 - Nos. 3B & 2B Milwaukee, Grd. Hd.
 - No. 2B Heavy B & S. SPD.
 - No. 2B B & S, Grd. Hd. SPD.

- PLANERS**
 - 84"x84"x18" N.B.P., M.D., 4 hds.
 - 72"x72"x14" Bettis 4 hds.
 - 72"x68"x16" Detrick & H. open side.
 - 60"x60"x20" Pond 4 hds.
 - 48"x48"x10" Detrick & H. openside.
 - 42"x36"x12" & 24"x6" Cincinnati.
 - 36"x36"x18" Sellers 4 heads.
 - 36"x36"x14" N.B.P. 2 hds. Rev. M.D.
 - 36"x36"x8" D. & H. Openside M.D.
 - 30"x30"x10" D. & H. Openside.
 - 24" Lynd Farquhar Openside.

- PRESSES**
 - No. 74 Bliss Consolidated.
 - No. 18 Bliss, O.B.I.
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 - 400 ton N. B. P. Hor. Hyd. Carwheel.

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 - 10"x 1/2" Pyramid, A. C., M. D.
 - 17"x1 1/4" Niles A. C. m. d.

- SAWS**
 - 10x10 Napier Metal Band Saw.
 - 6x6 Avey Milband.
 - No. 2B Gorton Internal, 7 1/2".
 - 6" Peerless univ., shaping.

TURRET LATHES

- Nos. 3A & 4, W. & S. Univ.
- 3 1/4"x36" & 2 1/4"x26" Acmes, Grd. Hd.
- No. 5 Foster, 1-13/16" bar cap.
- 24" Gisholt, AC M/D, 6 1/4".
- 21" Gisholt, AC M/D, 3 3/4".
- 4L Gisholt—no cross slide carriage.
- 24" Gisholt Cone 5 1/4" H. S.
- 26" Libby, 7 1/2" spindle hole M. D.
- 2 3/4"x24" & 3"x36" J. & L.

MISCELLANEOUS

- 2" Landis Bolt Threader.
- 156"x1 1/2" & 126"x3/4" United Shears.
- 15"x18" Dill Slotter, gear box M. D.
- 18" N. B. P. Slotter, A. C. M. D.
- Brake, Apron, 8"x10 ga., Chicago.
- 10"x10 ga. Chicago Apron Brake.
- 1 1/4" Gridley Automatic 4 Spindle.
- 2 1/4" Gridley Single Spin. M. D. Auto.
- Nos. 23, 24 & 34 New Britain chkg.
- Bolt Header, 2" Ajax.
- Nos. 3B & 4 La Pointe, Screw.
- Flanger, 1/2" McCabe Pneu.
- 11" Gleason Bevel Generator M. D.
- Hammers, 6B, 5N & 2B Nzelz.
- Pipe machine, 6" Oster M. D.
- 2" Bignal & Keeler Pipe Machine.

VERTICAL BORING MILLS

10' Niles, 2 swivel heads, Cone Dr.
 12' Gisholt, 2 swivel heads, P.R.T., M.D.
 18' Colburn, 2 swivel heads, S.P.D.
 42' Bullard, 2 swivel heads, S.P.D., P.R.T.
 42' Gisholt, 1 plain and 1 turret head, Motor
 Drive, Power Rapid Traverse

VERTICAL TURRET LATHES

24", 30", 42" Bullard New Era Type

LATHES

42"x27" American High Duty 16 Speed Geared Head, Constant Speed Motor Drive
 60"x22" Putnam, Cone, with raising blocks to swing 80°.
 30"x17" Houston, Stanwood & Gamble, Cone
 30"x12" American geared head, M.D.
 16"x6" Hendey geared hd., M.D., taper, collets
 12"x5" Hendey geared hd., M.D., taper, collets
 12"x5" American grd. hd., M.D., taper, collets
 12"x8" L. & S., cone, taper att., collets

GRINDERS

No. 16 Blanchard Direct Motor Drive, 26" chuck
 No. 3 Wilmarth & Norman Surface, Capacity
 8"x24", Magnetic Chuck
 14" mod., "B" Pratt & Whitney vert. surf., M.D.
 No. 13 B & S universal & tool, compl. equipment
 No. 65 Heald Internal
 No. 3 Bryant Internal

MILLING MACHINES

No. 4 Cincinnati Plain Geared Head, Rectangular Overarm, Rapid Traverse, Intermittent Feed, Single Pulley Drive

No. 4, No. 2 Cincinnati vert., S.P.D.
 No. 2-B Brown & Sharpe plain, M.D.
 No. 2-A Brown & Sharpe universal, M.D.
 No. 2 Kempsmith universal, cone
 No. 15 Garvin Vertical
 No. 4 Brown & Sharpe Plain, Cone
 No. 3 Kempsmith Plain, Cone
 No. 2 LeBlond Universal, Cone

AUTOMATIC SCREW MACHINES

2½" Gridley Model "G" 4-Spindle
 3½" Gridley Model "G" 4-Spindle
 1½" Cone 4-Spindle

TURRET LATHES

20" Libby, 7½" hollow spindle, M.D.
 20" Libby, 4½" hollow spindle, M.D.
 24" Gisholt, 6½" hollow spindle, Cone
 No. 5 Foster Gared Head, 2½" hollow spindle, S.P.D.
 37"x36" J. & L. with Bar and Chucking Equipment, S.P.D.

RADIAL DRILLS

7" American triple purpose, M.D. thru gear box
SHAPERS
 6" P. & W. vertical shaper, model "B", M.D.
 36" American, M.D., rapid traverse
 16" American, S.P.D.
 16" Gould & Eberhardt, M.D.

MISCELLANEOUS

Hammer, 300-lb. Bradley upright helve.
 Press, 50-ton Lucas forcing
 Shear, No. 662 Niagara squaring, capacity 10 ga., cutting length 64", 15" gap, M.D.

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Air Compressor, 6x6 Curtis dbl. cyl.
 Bar cutter, No. 8 Buffalo.
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 Boring mill, 51" Niles vertical.
 Broaching mch., V-1 American, 2-ton capacity.
 Burnishing mch., No. 1 Baird, dbl. ball.
 Drill, 24" Barnes, 5 spindle, self-oiling.
 Drill, No. 1½ Avery, 3 spindle.
 Drill, No. D-3 Colburn, h. d., 3" cap. in steel.
 Drill press, 4 spindle No. 2 Avery.
 Drill radial, 5' American triple purpose.
 Grinder, No. 10 Besley double disc.
 Grinder, 18" Diamond face.
 Grinder, No. 3 Abrasive surface.
 Grinder, No. 33 Abrasive surface, vert.
 Lathe, 26"x12" Rverson grd. head m. d.
 Lathe, stub, 12" Sundstrand.
 Miller, Type "C" Becker.

Miller, No. 2B K. & T. pl. complete.
 Miller, No. 13-B B. & S.
 Miller, No. 1 Kempsmith univ.
 Miller, No. 2 Kemp. pl. maxi. m. d.
 Planer, 56"x56x12" Gray.
 Planer, Cleveland 48x48x12 openside, factory rebuilt.
 Press, No. 18 Bliss o. b. i.
 Press, No. 5 Bliss solid back, m. d.
 Press, No. 5 Cons. 2 crks., 1" & 3" str.
 Screw machine, No. 4 W. & S.
 Shaper, 20" S. & M. m. d.
 Shaper, 20" American s. p. d.
 Shaper, 16" American, s. p. d.
 Shear, 10' 16 gauge Niagara, m. d.
 Turret lathe, No. 5 Foster universal.
 Turret lathe, No. 1-B Foster.
 Turret lathe, No. 2-B Foster.
 Turret lathe, 18" Libby.

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GUARANTEED TOOLS

AUTOMATICS

- 5/8" No. 19 Brown & Sharpe.
- 5/8", 1 1/4", 1 1/2", 2 1/4", 3 1/4" Gridley.
- 5/8", 7/8" Cleveland, Mod. A.
- 1" Cleveland dbl. end stud.
- 1 1/4" Cone 4-spindle.
- 1 1/2" Cleveland "M" 4-spindle.
- 1" and 1 1/4" New Britain.
- Nos. 53, 55, 56 Natl. Acme.
- 2" Mod. B Natl. Acme.
- 2" Cleveland Model A.
- 2" Cleveland, Mod. B.
- 10" Bullard Continumatics.
- 14" Fay.
- Hartness tilted.
- Nos. 24 and 33 New Britain.
- Nos. 454 & 654 New Britain.
- Nos. 5A, 6A Potter & Johnston.

BROACHES

- 10 ton Metalwood hydraulic.
- 15 ton Oilgear hydraulic.
- No. 3 Oilgear hydraulic.
- Nos. 1 1/2 & 3 American rack.
- No. 3 J. N. Lapointe double.
- Nos. 0, 3, 4 Lapointe.
- 2 ton American vertical.

COMPRESSORS

- Several from 25' to 92'.
- 106', 7 1/2" x 6" Chicago, NSB.
- 120', 8" x 6" Inger, Rand, ERI.
- 130', 8" x 8" Ing. Rand, ERI.
- 173', 9" x 6" Ing. Rand, ERI.
- 184', 9" x 10" Gardner Rix.
- 245', 10" x 10" Inger, Rand.
- ERI.**
- 265', 9 1/2" x 12" Worthington
- 355', 12" x 10" Ing. Rand, ERI.
- 369', 12" x 10" Chicago, NSB.
- 446', 14" x 9" x 10" Bury, 2-stg.
- 550', National type 3VD.
- 709', 17" x 9" x 12" Sullivan
- WJ3.
- 3200' GE Centrifugal, MD.

DRILLS

- 20", 23" & 26" Rockford.
- 21", 24" & 28" Cincinnati.
- 20", 22", 24" Barnes all geared.
- 30" Snyder.
- Nos. 216, 217, 315, 321 Baker.
- No. 2 Mfg. Colburn 1, 2, 3, 4 spdl.
- Natco multiple, Nos. 11, 12, C12, 13, C13, 14, B14 & 30.
- No. 1 Pratt & Whitney gun.
- 6 spdl. Pratt & Whitney deep hole.
- Nos. 6D, 11D & 16D Moline.
- No. 10D Moline cylinder borer.
- 5 spdl. Detroit automatic.
- Nos. 15 1/2 & 17 Foote Burt.
- 21" Morris radial.
- 21" Dresser radial.
- 21" Clint. Bick. radial.
- 4" Mueller radial.
- 4" Hammond radial.

6' N.B.P. univ. radial.

- 3 1/2", 4", 5", 6", 8" Western radial.

3' American sens. radial.

Sensitive—All makes & sizes.

FORGING TOOLS

- Nos. 23 & 25 W. & W. bulldozers.
- No. 5 I Naze hammer.
- No. 1A Ajax forge rolls.
- 1", 1 1/2" & 4" Ajax upsetters.
- 1 1/2" Acme upsetter.
- 1/2" No. 3 W. F. cold header.

GEAR CUTTERS

- Nos. 6 & 715 Fellows.
- No. 12 Barber Colman.
- Nos. 18H & 24H G. & E.
- Nos. 1 & 5A Lees Bradner.
- 28" G. & E. spur & bevel.
- 36" x 10" Newark automatic.
- No. 13 B. & S. spur & bevel.
- Nos. 3 & 4 B. & S. auto.
- 6" & 11" Gleason bevel.
- Gleason 2-spdl. chamferer.
- Gleason quenching press.
- No. 2 Bilton gear miller.

GRINDERS

- No. 2 Cincinnati centerless.
- No. 72 A3 Head Sizematic.
- Nos. 72 & 72 Head internal.
- No. 12 Bryant internal.
- No. 3 Barber Colman hob.
- 16" x 32" Norton crank.
- 16" x 48" Landis crank.
- No. 4 Brown & Sharpe univ.
- No. 16 Blanchard surface.
- 6" x 36" Norton surface.
- 8" x 20" Wil. & Mor. surface.
- 12" x 24" & 36" Diamond surf.
- 30" x 12" Springfield surface.
- 30" x 84" Diamond face.
- 18", 24" & 30" Gardner disc.
- Nos. 8, 220 & 221 Gardner disc.
- 8" Arter auto. piston ring.
- 12" Arter rotary surface.
- Landis:—6" x 18" to 16" x 53".
- Norton:—6" x 32" to 14" x 72".

ENGINE LATHES

- 9" x 31 1/2" South Bend bench.
- 10" x 6" Pratt & Whitney tool.
- 11" x 24 1/2" Sheldon.
- 14" x 6" Monarch.
- 14" x 6" Prentice geared head.
- 15" x 6" Sebastian grd. head.
- 16" x 6" Monarch.
- 16" x 8" Lodge & Shipley.
- 16" x 8" Walcott. Taper and reaming attachment.
- 16" x 8" L. & Shipley grd. hd.
- 16" x 10" L. & Shipley grd. hd.
- 20" x 8" Walcott.
- 21" x 18" LeBlond heavy duty.
- 22" x 10" Davis.
- 24" x 12" Lodge & Shipley.
- 26" x 12" Wickes.
- 27" x 12" Schumacher Boye.

BORING MILLS

- 24" Bullard, side head.
- 30" Bullard, single turret.
- 34" Colburn single turret.
- 36" Niles car wheel.
- 42" King, 1 pl. & 1 turret hd.
- 42" Detrick & Harvey.
- 60" Gisholt.
- 3" Binsee horizontal.

MILLERS

- Nos. 2, 3, 4 Cincinnati.
- Nos. 1 1/2, 2 hvy., 3B & 4B B&S.
- No. 2 1/2 Rockford.
- No. 3 Kempsmith.
- No. 4 Hendey.
- No. 1 1/2 Rockford univ.
- No. 2 Cincinnati univ.
- No. 2 Brown & Sharpe vert.
- No. 6 Becker vertical.
- 24" Cincinnati duplex.
- 24" & 48" Cincinnati automatic.
- 24" & 48" Newton rotary.
- 48" Ohio tilted offset.
- Nos. 13B & 33 B. & S. Mfg.

PLANERS

- 24" Cincinnati crank.
- 30" x 30" x 12" Cleveland openside.
- 32" x 32" x 12" Niles.
- 36" x 36" x 8" Gray.
- 36" x 36" x 12" Gray heavy.
- 36" x 36" x 16" Cleveland openside.
- 48" x 36" x 10" Liberty openside.

PRESSES

- No. 5 grd. Toledo OBL.
- Nos. 19 and 21 1/2 Bliss o.b.l.
- No. 75 grd. Toledo openback.
- Nos. 1 1/2 B & 5A Bliss toggle.
- No. 268 Consol. cam draw.
- No. DDG 4 Ferracute cam.
- 600 ton Cleveland coining.
- 250 ton Ferracute coining.
- Nos. 55 1/2, 56, 56 1/2, 58 Toledo.
- Nos. 64, 65, 66 Consolidated.
- No. 74 1/2 Bliss.
- No. PG 4 Ferracute.
- No. 94 Consolidated.
- 72" No. 3G Bliss dbl. cr.
- No. 30% Bliss arch frame.
- No. 23, 25 1/2, 26 Consol. horn.
- No. 7 Z & H. percussion.

SHEET METAL TOOLS

- 4" x 4" Niagara shear.
- 10" x 16" ga. Bertsch shear.
- No. 1 Gray metal cutter.
- Nos. 1 & 2 Campbell nibblers.
- 48" McKay roller leveler.
- 5/8" & 1 1/2" Shuster straighteners.
- Nos. 1 & 2 Pettingill hammers.
- 1 1/4" x 1/4" Bertsch angle roll.
- Spot welders, 7 to 100 k.v.a.

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MILES MACHINERY CO.
SAGINAW, MICHIGAN

REASONABLY PRICED TOOLS

PRESS, No. 305 Bliss, straight side, back geared, steel tied frame, 5" stroke.

AUTOMATICS, Several Model A Clevelands, from $\frac{1}{4}$ " to $3\frac{1}{2}$ " bar capacity.

BOLT CUTTER, $1\frac{1}{4}$ " Acme single, class A. Very good.

DRILLS, 36" Cincinnati back geared, sliding head, tapping attachment.

24" Edlund Production $1\frac{1}{4}$ " cap. power feed; No. 12 Minster H. D.;

2-**Spindle 20"** Barnes All Geared Self Oiling M. D.

3-**Spindle 20"** Barnes All Geared Self Oiling belt drive.

GRINDERS, 14" x 72" Norton Plain; 12" x 72" Landis M. D.; No. 78 Wilmarth & Norman Surface Grinder M. D.; No. 22 Heald Rotary 12" Magnetic Chuck.

LATHES, 16" x 6' Hendey Tool Room, Cone Head, Taper Relieving & Collet Attachment, 2-Speed A. C. Motor Drive 2 Chucks. Serial over 26000.

18" x 8' Greaves-Klusman double b. g., quick change.

MILLERS, No. 2B Brown & Sharpe plain, single pulley drive; No. 6 Becker Vertical with ball bearing countershaft; No. 3 Milwaukee Plain, Timken Bearings, Vertical Head, Rapid Traverse, Motor in Base; No. 1/2 Van Norman, 8" P & W Automatic.

PLANERS, 42" x 42" x 12" Gray Planer widened to 54". Table 50" wide, one rail head, one side head. Motor Drive. 30" x 30" x 8' Cincinnati, two heads on rail.

PRESSES, O. B. I.—No. 105 Bliss Consolidated, dbl. crk. incl. flywh. type, arr. for motor. No. 2 Rockford 3" stroke; No. 3 and 4 Walsh; No. 2 1/2 Robinson.

RADIAL DRILL, 3' Prentice, gear box drive; 3' Cincinnati Bickford gr. box drive.

SCREW MACHINES, Nos. 2 and 4 Milholland, friction head, power feed to turret.

Many other tools—exceptional "buys"—write for full details.

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JOHNSON'S BARGAINS

SPECIALS

Smalley General Internal thread miller, 30" swing, cross slide and taper attachment
motor drive A. C.
3-B. & W. 80" x 18" roll corrugating machines.
30" x 144" Land & cylindrical grinder S. P. drive.

Air compressors, 30' to 2000'.
Bolt threader, 2 heads, National 1".
Boring mill, 36" King turret; 60" Colburn 2 heads.
Boring mill, 44" Niles, vertical, 2 heads.
Boring mill, 8-12" Bettis, vertical.
Boring mill, horizontal 4 1/2" bar Bettis knee type.
Boring mill, horizontal, Barrett, 6" bar.
Drill, radial, 4" Dresses; 4" Bickford.
Drills, 25 various, upright.
Drills, Colburn 44.

Flanging machine, $\frac{1}{2}$ " McCabe.
Gear cutters, No. 1 and 3 Adams hobs.
Grinder, Wood Bros. universal.
Grinder, 6x18" Ott; 10x14 Landis; 8x16 Mod.
Hammers, Drop, various sizes.
Hammers, 500 and 25 lb. Little Giant.
Hammer, 200 lb. Bradley.
Hammer, steam 4000 to 250 lb.
Lathe, 18" x 8" Boyes & Emmes.
Lathe, 18" x 8" Lodge & Shipley QCG cone.
Lathe, 15, various sizes.

Lathe, turret, No. 3 and 7 univ. Bardons Oliver.
Lathe, 36" H. S. & G., heavy duty.
Lathe, turret, No. 6 Woods, tilted.
Lathe, 3 Gridley 2 1/4", Model F, 4 spindle.
Miller, No. 22 universal rebuilt.
Miller, Pratt & Whitney spline.
Miller, No. 4 Brown & Sharpe, plain.
Miller, Waltham thread.
Press, No. 2, 3 and 4 Marshalltown, o. b. i., new.
Presses, hydraulic up push 18" dia. piston 38x28
bolster and pump.
Punches and shears, structural all sizes.
Saw, No. 14 Higley.
Shear, 16", 20" and 24".
Shear, 3" Niagara, 16 gauge.
Shears, squaring Niagara 8", 14 gauge.
Shears, 310 Niagara ring and circle 1/4".
Seamer, double Bliss No. 5.
200 electric motors and generators.
Gas oil, and steam engines.
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 Brakes, power, Chgo. Steel 10' 3/16"; 10' 10 ga.; 8' 10 ga.; 8' 1/4", 6' 12 ga.
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 Cameron Lock Seamer and other can mchys.
 Crimping Rolls, 36" Niagara, 3/4" corr.
 Drill Radial, 3" Amer., s.p.d. thru gear box.
 Gang Slitter, 36" Yoder, m. d., leveling rolls.
 Grinder, No. 25 Head Surf. 16" mag. chg. hyd. fd.
 Grinder, cyl., No. 11 B&S, Landis univ. 10'x30".
 Grinder, disc, 30" No. 24 Gardner, b.b. 52" hor.
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 Compl. with pyrometer-\$5000 (new \$30,000).
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 Lathes, spin., Prybil 22", bb.; Tol. 30" bb.;
 Bliss 30" bb. (25 in stock).

Presses, dbl. crk., No. 92B Toledo, 12" st. 38x62 bet. posts.
 Press, Hyd. Watson S., 200 ton, 2-10" rams, 38x62 bet. posts.
 Press, dbl. crk. tog. No. 408-B, Bliss 84" bet. upr. 58x84 bed tie rod.
 Press, dbl. crk. Niag., No. 615, 62" bet. upr., shaft 8" dia., tie rod.
 Press, Horn, No. 4A Bliss, 4" st., sw. tbd., m. d.
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 Saws, hack, 6x6", 9x9" Peerless; 12x12" H.S., m.d.

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 Baling press, Galland & Henning, No. 10—M.C., with triplex pump, operating valve, makes bales, 30 to 60 lbs.
 Boring Mill, Bullard 36", New Era, over 11,000 serial.
 Hagen Porcelain Vitreous Enameling Furnace in electric, complete with panel control, etc.

Lathe, 36"x30' L. & S., 24" centers, q. c. g.
 Press, gang, Bliss H. & D., 3' bet., 10" shaft.
 Press, 78" Bliss SS, friction clutch.
 Press, No. 96G Toledo dbl. crank, 146" between, 24" str., tie rod, wght. 162,000 lbs.
 Press, 1,000 ton all steel S.S., 9" stroke.
 Roll, Niagara 10' 3/16", slip end, three roll drive, power elev. roll.
 Screw machine, model M, 4 sp., Cleveland.
 Vit. Porcelain Enameling Furnace, oil burner, compl. with charging forks, pyrometer, etc.

Lathes, 30"x16' L&S., t.a.; 26"x16' Bradford, t.a.; 25"x16' Ryerson, g.h., m. d.
 Lathes, Tool Stock, 14x6 L & S.; 18x8 South Bend, m. d.; 22"x12' American.
 Leveler, 48", 17 rolls, motor drive.
 Millers, Plain, No. 1A K. & T., dbl. over.; No. 2B B. & S., m. d. (2).
 Millers, Plain, No. 3B and No. 1A Kearney & T.
 Millers, Pl. & Vert., No. 3 Inger. 14x48 tbd. s.p.d.
 Millers, planer type, 36"x16" Ingersoll.
 Millers, Univ., No. 2A B. & S., div. hd., m. d.
 Nibblers, No. 1 Gray, 3/16", 34" th., b.d.; No. 1 & 1B Campbell, m. d.; No. 2 Campbell.
 Pebble Mill, Paterson, m. d.
 Planers, 48" Gray Widened Pattern, 2 heads.
 Presses, No. 8 1/2A Bliss toggle.
 Presses, dbl. crk., No. 65D Niag., s.s., 60" bet.

Screw Mch., auto, 1 1/4-1 1/2 Cleve. Mod. A, sq. pan. No. 55 National Acme 4 spindle.
 Screw Mch., auto., No. 506 New Brit. 6 sp. m.d.
 Shaper, 24" Ohio Dreadnaught, tilt top tbd., force feed lub., m. d.
 Shapers, 20" Queen City; 16" & 24" Milwaukee; 16" & 24" Gould & Eberhardt.
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 Shears, pwr., 25 new Pexto shears 3' to 10'.
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20" x 9" Hamilton, q. c. g.

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4½" x 12" Pratt & Whitney thread.

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6" str., bed 36" x 72" die ap. 14".

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10" Pratt & Whitney vertical.

32" Cincinnati, b. g. crank.

24" Rockford, gear box, arr. m. d.

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20" American, gear box, arr. m. d.

20" G. & E. & Milw. b. g. crank.

17" Averbeck, b. g. crank.

16" Gould & Eber, b. g. crank.

48" x 48" x 16" N. B. P. 4 heads.

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24" Barnes four spindle, Camel Back, heavy.
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4" Ryerson, gear box.

6" American, gear box.

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6 1/4" x 24" Gisholt—rebuilt.

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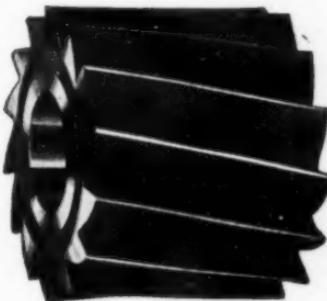
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2 1/2	7/16	1	2.45	3	1 1/4	1 1/4	4.95
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2 1/2	3/4	1	3.00	3	3	1 1/4	9.05
2 1/2	1	1	3.45				
2 1/2	1 1/2	1	4.30	4	1 1/4	1	3.55
2 1/2	2	1	5.15	4	5/16	1	3.85
2 1/2	2 1/2	1	6.05	4	3/8	1	4.10
2 1/2	3	1	6.85	4	1/2	1 or 1 1/4	4.65
3	3/16	1	1.90	4	3/4	1 or 1 1/4	5.60
3	1/4	1	2.50	4	1	1 1/4	6.55
3	5/16	1	2.70	4	1 1/2	1 1/4	8.55
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14" x 6" American, Geared Head, M. D.
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20" x 9" and 28" x 11" Hamilton.
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24" Stark Precision Bench Lathe, Complete.
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- 20" x 10" American 3 S.C.D. D.B.G.
- 20" x 14" Hendey Cone, Taper.
- 20" x 25" American H.D. cone, Taper.
- 21" x 10" LeBlond Grd. Hd. S.P.D.
- 20" x 8" American Grd. Hd. S.P.D.
- 24" x 12" American Cone H.D. Q.C.
- 24" x 12" Lodge & Shipley Cone, Q.C.
- 24" x 22" Bradford Cone, Taper.
- 26" x 10" Sidney 3 S.C.D. Q.C.
- 26" x 14" Bridgeford Grd. Hd. S.P.D.
- 27" x 12" American 3 S.C.D. D.B.G.
- 27" x 16" L & S Sel. Grd. Hd. S.P.D.
- 28" x 18" Bradford Cone, Q.C.
- 30" x 12" American 3 S.C.D. B.G.
- 30" x 16" American 12 Spd. Grd. Hd. S.P.D.
- 36" x 12" L & Sel. Grd. Hd. Taper S.P.D.
- 36" x 24" L & S Sel. Grd. Hd. Taper S.P.D.
- 36" x 36" LeBlond Trip. Grd. 3 S.C.D. Bor. Attach.
- 42" x 18" Bridgeford Grd. Hd. M.D.
- 42" x 20" American Grd. Hd. M.D.

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- 16", 20", 24" Gould & Eberhard Cone Drive.
- 16", 20", 24", 28", 32", Gould & Eberhard S.P.D.
- 16", 20", 24", 28", Gould & Eberhardt M.D.
- 20" Columbia H.D. Cone.
- 24" Smith & Mills S.P.D.

Radial & Drill Presses

- 21" Cincinnati Bickford tapping attachment.
- 24" Cincinnati Bickford Tapping attachment.
- D.1 Colburn H.D. 20" four spindle Barnes.
- 6" Fosdick Plain S.P.D. 6" American Trip. Grd.
- 3" American sensitive Cone.
- 3" and 6" American Trip. Purp. Enclosed Hd.

Gear Cutters

- No. 1 and 3 Adams Farwell Hobbers.
- No. 6, 624 Fellows Gear Shapers.
- No. 12 Barber Colman Hobbers.
- 6", 11" Gleason Bevel Gear Generators.
- No. 6-60", 3-26", 4-36", 4-48" B & S Automatic.
- 6" Bilgram Gear Generators.

Milling Machines

- No. 1 Knight Miller & Driller.
- 24" Cincinnati Automatic Plain Like New.
- No. 33 Kempsmith Plain Production M.D.
- No. 3-48" Garvin Duplex M.D.
- No. 2 Hendey Univ. Div. Hd. Cone.
- No. 2 Kempsmith Univ. Div. Hd. Cone.
- No. 2 Cleveland Plain, S.P.D.
- No. 2 Cincinnati Plain.
- No. 2A Milwaukee Plain Mfg. S.P.D.
- No. 2½ Rockford Univ. Cone.
- No. 3 Cincinnati H.P. Univ. Div. Hd.
- No. 3 Kempsmith Univ. Cone.
- No. 4 Cincinnati Plain H.P. Cone.
- No. 4 Cincinnati Univ. H.P. Cone. Div. Hd.
- No. 4 Cincinnati H.P. Rect. O.A. S.P.D. Vert.
- Grinders**
- No. 1 LeBlond No. 13 B. & S. Univ. Tool & Cut.
- No. 3 Ohio Universal Tool & Cutter.
- No. 4 Oliver Drill Grinder M.D.
- No. 51 Oliver Drill Grinder M.D.
- No. 2 Brown & Sharpe Surface, Mg. Chuck.

- 60" Blanchard M.D. Like new.
- No. 5-48" Abrasive Surface M.D. 100 Hrs. us.
- 14" Pratt & Whitney b. b. Surface, Mag. Chuck.
- No. 78 Wilmarth & Mornan Surf. Grdr., Bel.
- 3" Pratt & Whitney Surface.
- 30" x 120" Landis Self Contained BIT. Drive.
- 6x18" 10" x 36", 12" x 36" Landis Self Contained
- 12" x 30" Bath Univ.
- No. 50, 55, 60, 65 Heald Internal.

Hammers

- No. 2½ Moesberg & Granville Drop Hammer.
- 50 lbs. Little Giant.
- No. 4B and 6N Nzel Air Hammers.

Tappers

- No. 1, No. 2, No. 2X, No. 2BG Garvin Auto.
- Vertical Mills & Boring Mills**
- 24" Bullard Rapid Production S.P.D.
- 42" Coiburn Rapid Trav.
- 60" Cincinnati Rap. Prod., Rap. Trav. Arr. M.
- No. 2 B & S Vertical Mill Cone.
- No. 2 B & S Vertical M.D.
- No. 5B Becker Vertical Miller.

Pipe & Bolt Machines

- 1" 2" Acme Class A Bolt Cone.
- 2" Acme M.D.
- 2½" 2½" 3" Landis Bolt Cone.
- 2½" Landis with Lead Screw.
- 2½" Landis Pipe.

Saws

- 6x6, 12x12 Racine Belt; No. 7 Atkins 8x8.
- No. 2 Klemm Metal Band Saw.

Shears

- No. 1 Covington Plate Shear, 13" x 14" Arr. M.
- No. 9C Beloit Punch & Shear.
- No. 14EF Pels Bar, Angle & T Shear, M.D.
- No. 2 Bethlehem Rotary Slitting Shear.

Brakes

- No. 184 Chicago Steel Bending Brake Arr. M.
- 8" x 10" gauge.

- 10" x 10" Gauge Chicago Steel Bending Brake.

Riveters

- No. 1½ B, 4A, 2A HD. High Speed Riveters.
- No. 80-80B Grant Rotary Spinners.

Keyseaters

- No. 0, No. 2 Baker, No. 3 Baker.

Presses

- No. 4 Verdin, Kappes, Verdin.
- 13" Ferracueto.
- No. 31 Toledo.
- K.15, 30 Ton Lucas Forging.
- 150 Caldwell Hydraulic Wheel Press.
- Drills, Mult.**
- No. 11, No. 12, No. 40 Natco 8 spindles.
- Foote Burt Mult. Spindle 32 spindles.

Turret Lathes

- No. 7 Foster Univ. Grd. Hd. 4½" Hollow sp.
- No. 4 & 6 Warner & Swasey Plain, Bar Fe.
- No. 4 Gisholt Plain.
- 26" Libby Grd. Hd. 7" hollow spindle.
- 14" x 19" Fay Automatic.
- No. 2A W. & S., Timken, Serial over 350,000.

Horizontal Mills

- 2½" Bar Universal S.P.D.
- No. 1 Niles Horizontal Taper type.
- No. 1, 2, 3 Barrett Horizontal.
- No. 1 Rockford.

Miscellaneous

- Fisher Oil Groover.
- No. 11 Dwight Slate Marking Machine.
- No. 12, No. 13 Pratt & Whitney Profilers.

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 4" DIAMOND FACE GRINDER, M. D.
 8" x 8" LANDIS PLAIN CYL. GRINDER.
 00" G. EBERHARDT HORIZ. HOBBER.
 0" PRATT-W. SPUR GEAR CUTTER.
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 7" x 1 1/2" HILLES-J. BENDING ROLLS.
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 6" and 42" BULLARD NEW ERA TYPE.
 1" BAR D-H HORIZ. FLOOR TYPE.
 1" BAR ESPEN-LUCAS HOR. FL. TYPE.

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 92" x 87" x 42" N-B-POND H. D. PLANER.
 84" x 84" x 20" N-B-POND H. D. PLANER.
 72" BEMENT M. D. ROTARY PLANER.
 60" x 60" x 14" POWELL M. D. PLANER.
 48" x 48" x 14" N-B-POND PLANER.
 30" x 30" x 8" CLEVELAND O. S. PLANER.
 No. 2 CINCINNATI H.P. VERT. MILLER.
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 Nos. 2-B and 3-B MILW. PL. MILLERS.
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 54" x 54" x 16" INGER. Planer Type MILLER.
 62" x 62" x 15" ING. Planer Type Slab MILLER.
 10" x 3" x 8" OHLS PRESS BRAKE M. D.
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 5" AMERICAN TRIPLE PURP. RADIAL.
 No. 3-A W. & S. TURRET LATHE.
 Nos. 2, 4, 6 W. & S. SCREW MACHINES.
 6" PRATT-WHITNEY VERT. SHAPER.

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 Albany, N. Y.
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HIGH GRADE MACHINE TOOLS

GRINDERS

Brown & Sharpe Universal — No. 4.
 No. 2 Diamond Surface.
 No. 70 Head Internal.
 6" Diamond Face.
 Norton—6x32 and 10x50
 No. 24—53" Gardner HORIZ. Disc.
 Swasey Disc Grinders — No. 10-17.
 Head Surface Grinder No. 2.

DRILLS

Wey—1, 2, 3, 4 spindle.
 30 Mac. S. S. Drills, all sizes and makes.

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Cincinnati No. 1 Univ. No. 2 and 35 Plain.
 Milwaukee Universal No. 1B.
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 Pratt & Whitney—12" Automatic.
 Becker Vertical—No. 6.
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TURRET LATHES

Warner & Swasey No. 2, 4, 6.
 Warner & Swasey No. 4 and 2A Universal.

PLANERS AND SHAPERS.

Gould & Eberhardt Crank—20", 24", 28".
 Cincinnati Crank Planer—24x24x24".

PRESSES

Toledo—O. B. I. No. 5A and 6.

GEAR CUTTERS

Barber Colman—No. 3 and 12.
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 Gleason Spiral 15".

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 Air Compressors—Gardner 9x10".
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 1000 Electric Motors—all sizes.

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- GEAR CUTTERS; G & E 36", G & E 48", G & E 60" & B & S 26" s. p. d. automatic spur; Fellows 36" gear shaper. Cincinnati 36" gear cutter.
- GRINDERS; P & W 12" vert. surf.; Cin. No. 1½ & B & S No. 12 univ. tool. B & S Nos. 11 & 16 plain, Heald Nos. 60 & 65 Int.; B & S No. 13 Univ. & Tool; Landis 10x30" Plain; B & S 10x48"; 4—Norton 6x32" plain, Heald No. 20 Rotary Surface (3). B & S No. 2 Univ.; Diamond No. 2 surface; Badger No. 220, auto. d.e., opposed disc (4).
- HONING MACH.; Hutto 2-spindle Vert. M. D.
- KEYSEATERS; M & M No. 2 vert. Burr horiz.; Davis No. 1 vert.
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- MILLING MACHINES; Van Norman No. 2 duplex; Ohio No. 24; Kemp. No. 3; B & S No. 3; Cleve. No. 1 s. p. d. univ.; B. & S. No. 2; Amer. No. 1½; Cin. No. 3; B & S No. 3; Hendey No. 3; LeBlond No. 3; Mil. No. 3-B & Cinc. No. 3 s. p. d. pl.; Becker Model "B" & No. 6 vert.; Kemp. No. 33 s. p. d. Prod.; Ingersoll slab, m. d. 33", table 30½"x16".
- PIPE MACHINES; Landis 12" A.C., m. d.
- PLANERS; Gray 30"x30"x10' 2 heads; Flather 24"x24"x6"; Gray 28"x28"x6' 1-hd.
- PUNCH PRESSES; Bliss No. 19 o. b. i.; Toledo No. 35 cl. back; Toledo No. 3 o.b.i.; Fer. No. PG-3 cl. back; L. & J. No. 3; Federal Nos. 1, 2, 3 and 4 o.b.i.; R. & K. No. 3 o.b.i.; Bliss No. 62 geared; Ferracutte No. P-3; Bliss No. 65-N, 68-N dble. action; Michigan No. 82-B double crank; Toledo No. 52 arch.
- SAWS (HACK); Racine 6x6" H. S. (4); Peerless 6x6" M. D. Univ. Shaping (2).
- SHAPERS; S & M, G & E, Ohio, Mil., Q. City, Davis, Cin. 16"; Ohio & G & E 20"; S & M, Q. City, Rock, 24"; Ohio 26"; Cin. 24" s. p. gr. box; Rhodes 3½" Vertical; American 24" heavy, b.g.
- SCREW MACHINES; W & S No. 6 Hand; Nat. Acme. Nos. 515, 52, 55, & 56 4-sp.; Gridley 4-sp. 7/8" & 4-sp. 1 1/4" cap.; Automatic, B & S No. 00 auto.
- TAPPING MACHINES; (2) Garvin No. 2 Vertical Automatic.
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- TURRET LATHE; Bullard 36" vertical, rapid production.

Above is only small part of our large stock on hand.

McDONALD MACHINERY CO.

1531-35 No. Broadway

ST. LOUIS, MO.

SELECT INLAND TOOLS**LATHES**

12¹ x 5¹ Clevel. Tool Room, Gtd. Hd.
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Taper Att., collets.
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16¹ x 10¹ Hamilton, Q. C. G.
18¹ x 8¹ LeBlond, Q. C. G. Pan Bedt.a.
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24¹ x 12¹, 24¹ x 16¹ L. & S., Q. C. G.

1/2", 3/8" Hardinge Precision Bench.**GRINDERS**

16¹ Head Rotary Sur. Mag. Chuck.
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No. 2 LeBlond, Plain.

No. 2 Pratt & Whitney, Vertical.**TURRET LATHES**

No. 1 Foster, Wire Feed, 3/4" Cap.
No. 4 & No. 6 Warner & S. Bar Feed.
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25 O. B. I. Presses in stock.
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Niagara, Nos. 4, 4½.
Walsh No. 3.
Torri - Wold No. 15.
Maxam No. 3 (4)
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CHICAGO, ILLINOIS****NEW 3 Phase Motors 1 to 20 H. P., 5 H. P. \$55.75****LATHES**

11¹ x 4¹ Shaffner Bench (new) motor drive.
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10¹ x 6¹ Sidney Lathe, floor type H. S-CP rest.
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12¹ x 5¹ LeBlond; 12¹ x 6¹ Monarch.
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16¹ x 8¹ Hamilton, quick change.

16¹ B. G. Queen City, (2).
20¹ and 21¹ Smith & Mills.

No. 11½ Valley City, plain.
No. 4 LeBlond plain.

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No. 31 Lucas, Horizontal Rapid Traverse.
42¹ Bullard Vert., 1 turret & 1 plain head.
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(2) No. 2 Diamond Surf., 34" mag. chuck.
No. 13 Brown & Sharpe Universal all Attach.
No. 6 & 12 Bryant Internal.
No. 70 & 75 Head Internal.
No. 12 & 15 G. & L. Teromatic hydraulic feed.
3 motors.

KEYSEATER: (2) No. 2 Mitts & Merrill.

LATHES: 19¹ x 8¹ LeBlond, rebuilt.

16¹ x 12¹ South Bend, Q. C. G. Complete.

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3x36¹ Jones & Lamson, steel head, Timken Spindle., M. D. bar equipment, tools.
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MILLS: No. 5 Becker Vert. M. D.; No. 3 Becker Univ. Complete.**SHAPERS:**

16¹, 20¹, 24¹, & 32¹ Gould & Eberhardt, M. D.

SLOTTER: 6¹ Newton, power feed.

PRESSES: No. 96-A Toledo Dbl. Crank, 6¹ strk.

900-Ton Zeh & Hahnenmann Percussion, m. d.

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2 H. P. A. C. 3 phase 60 cy. 220/440 1750 r. p. m.	\$35.00
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Complete stock of machinery.

OHIO MCHY. & SUPPLY CO., 309 E. Second St., CINCINNATI, O.

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- 12⁸ x 6¹ Prentice.
- 14⁸ x 6¹ LeBlond.
- 14⁸ x 6¹ Hendey.
- 14⁸ x 8¹ Hendey.
- 14⁸ x 6¹ Bradford.
- 14⁸ x 6¹ Reed-Prentice.
- 14⁸ x 6¹ Prentice.
- 16⁸ x 8¹ Hendey.
- 16⁸ x 9¹ Chard.
- 16⁸ x 8¹ Prentice.
- 16⁸ x 8¹ American.
- 16⁸ x 8¹ Monarch.
- 16⁸ x 8¹ LeBlond.
- 16⁸ x 8¹ Pratt & Whitney.
- 18⁸ x 8¹ LeBlond.
- 18⁸ x 8¹ Lodge & Shipley.
- 18⁸ x 8¹ Prentice.
- 18⁸ x 8¹ Schumacher & Boye.
- 20⁸ x 14¹ Hendey.
- 20⁸ x 10¹ Greaves Klusman.
- 20⁸ x 8¹ LeBlond.
- 22⁸ x 8¹ Lodge & Shipley.
- 24⁸ x 10¹ Prentice.
- 24⁸ x 10¹ American.
- 24⁸ x 16¹ Sidney "Tritrol".
- 25⁸ x 10¹ Ryerson-Conradson.
- 26⁸ x 12¹ Wickes.
- 26⁸ x 16¹ Bridgeford.
- 26⁸ x 20¹ Bridgeford.
- 27⁸ x 16¹ LeBlond.
- 27⁸ x 16¹ Bridgeford.
- 30⁸ x 13¹ Wickes.
- 30⁸ x 11¹ H-S-G.
- 30⁸ x 26¹ Lodge & Shipley.
- 36⁸ x 22¹ Bridgeford.
- 36⁸ x 32¹ Bridgeford.
- 36⁸ x 38¹ Bridgeford.
- 36⁸ x 15¹ Lodge & Shipley.
- 42⁸ x 24¹ Putnam.
- 56⁸ x 20¹ Lodge & Shipley.
- 56⁸ x 34¹ Pond.

TURRET LATHES

- No. 4—No. 7 Bardsom & Oliver.
- No. 4—No. 6 Woods Tilted.
- Nos. 1A, 2, 2A, 3A, 4, 6W, & S.
- Nos. 1B, 2B, 5, 7 Foster.
- 18⁸—26⁸ Libby.
- No. 4 Gisholt.
- Jones & Laramon, dbl. spindle.
- 2⁸ x 26¹—3⁸ x 36¹ Acme.
- 2⁸ x 24¹ Jones and Laramon.

HIGH SPEED DRILLS
(1 to 4 spindles)

- No. 1⁸, No. 1¹_{2, No. 2, No. 3 Avery.}
- No. 2—No. 3 Avery-Matic.
- 14⁸—16⁸ Allen.
- 14⁸—Canedy Otto.
- 14⁸—16⁸ Demco.
- 16⁸—Detroit.
- 18—28—38—4B Edlund.
- 13⁸—16⁸ Foadick.
- 16⁸—Gordon.
- No. 3 Henry & Wright.
- 6⁸—Langelier.
- Nos. 1, 2, & 3 Leland Gifford.
- No. 2 Pierle.
- 16⁸—24⁸ Sipp.
- 12⁸—14⁸—16⁸ Taylor & Fenn.

This is a partial list. Many others in stock. Also a very large stock of presses, Structural and Sheet Metal Tools—Gear Machines and Miscellaneous others.

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- 8⁸—12⁸—15⁸ Sundstrand Stub.
- Nos. 6—9—12 LeBlond Multi-Cut.
- Nos. 1F—3F Foster Fastermatic.
- 9⁸ x 12⁸—9⁸ x 20¹ Porter Cable.
- Model R Lo Swing.
- 3⁸ x 36¹—3⁸ x 60¹—3⁸ x 84¹ Lo Swing.
- 4⁸ x 36¹ Lo Swing.
- 7⁸ x 60¹—8⁸ x 60¹ Lo Swing.
- 30⁸ Gisholt Simplimatic.
- 14⁸ x 19¹—14⁸ x 31¹ Fay Auto.
- Nos. 4D, 5A, 6A, 6C Potter & J.
- No. 3 Lodge & Shipley Duo-Matic.
- 14⁸ x 16¹ LeBlond.
- 17⁸ x 6¹—17⁸ x 8¹ LeBlond.
- 17⁸ x 10¹ LeBlond.
- 19⁸ x 8¹ LeBlond.
- 20⁸ x 8¹ LeBlond.
- 21⁸ x 8¹—21⁸ x 12⁸ LeBlond.
- 20⁸ x 6¹—20⁸ x 7¹ 6⁸ Wickes.
- 20⁸ x 10¹ Wickes.
- 20⁸ x 6¹ Sebastian.

MILLERS

(Plain-Univ.—Vert.)

- 0Y—1Y—2B—No. 4—No. 4B—No. 5B
- Brown & Sharpe.
- Nos. 2—3—5—4 Cincinnati.
- Nos. 1A—2A—2B—3—3B Kearney & Trecker.
- No. 2—No. 4 Kempthorn Maximill.
- No. 2—No. 3H LeBlond.
- No. 0 Rockford.
- No. 2 Ryerson-Conradson.
- No. 2 Cincinnati univ.
- No. 3AU Garvin univ.
- No. 4B Kearney & Trecker univ.
- No. 3 Ryerson-Conradson univ.
- No. 3—No. 5C—No. 6 Becker vert.
- No. 1M—No. 4 Cincinnati vert.
- No. 2 Brown & Sharpe vert.
- No. 4B Kearney & Trecker vert.
- Taylor & Fenn vert.
- D-1 Becker vert.
- Billing & Spencer vert.
- No. 2—No. 3 Pratt & Whitney vert.
- E-4 Keller Profiling.
- 12⁸—18⁸ Cincinnati.
- No. 1A Kearney & Trecker.
- No. 32—No. 33 Kempthorn.
- No. 3 Sundstrand Rigidmill.
- 18⁸—24⁸—48⁸ Cincinnati Duplex.
- 18⁸—24⁸—48⁸ Cincinnati.
- 3—36¹—4—36¹—4—48⁸ Cincinnati dup. Hydromatic.

UPRIGHT DRILLS

- 28⁸—40⁸ Aurora.
- 20⁸—22⁸—26⁸—34⁸—42⁸ Barnes.
- 21⁸—24⁸—28⁸—(25—36)⁸ Cincinnati.
- 20⁸ Canedy Otto.
- 14⁸—Excelsior.
- 21⁸—Foadick.
- 26⁸—32⁸ Hoefer.
- 26⁸—Hamilton.
- 22⁸—Milwaukee.
- 26⁸—Rockford.
- 21⁸—Superior.
- 28⁸—Snyder.

21⁸—25⁸ Weigel.

RADIAL DRILLS

- 2¹₂ Ayer Bench Type.
- 3¹—4¹—5¹—6¹ American.
- 3¹ Carlton.
- 2¹₂—5¹—6¹ Cincinnati.
- 4¹ Hammond Mod. B.
- 4¹ Foadick and 3¹₂ Morris.
- 5¹ Prentice.
- 5¹—8¹ Ryerson.
- 4¹—6¹ Western.

HEAVY DUTY DRILLS

- Nos. 121—216—217—310 Baker.
- Nos. 314—315—422—513 Baker.
- 20⁸—22⁸—24⁸ Barnes Camel Back.
- No. 2—No. 4 Colburn Mfg.
- D-2—D-4—D-5 Colburn.
- 20⁸—21⁸—24⁸ Cincinnati Prod.
- 24⁸ Defiance.
- No. 1 Hoosier.
- No. 23—24—25 Foote Burt.
- No. 1 Minster.
- No. 9 Natco-Minster.
- No. 12 Minster Jr.

GANG DRILLS

- 2—3 and 4-spindle No. 2 Colburn.
- 2-spindle No. 6 Culburn.
- 2-spindle 28⁸ Cincinnati.
- 4-spindle 21⁸ Cincinnati.
- 6-spindle 42⁸ Cincinnati.
- 2-spindle 22¹₂ Barnes.
- 6-spindle No. 242 Barnes.

RAIL DRILLS

- 2—3 spindle No. 17 Foote-Burt.
- 4-spindle No. 1 Foote-Burt.
- 2—4 spindle No. 4¹₂ Foote-Burt.
- 4-spindle No. 13D Moline.
- 8-spindle No. 64D Moline.
- 8-spindle Moline Hole Hog.

MULTIPLE DRILLS

- Nos. 11—12—13—14—16—C5—C12
- C13—13—B12C—No. 30 Natco.
- No. 15HC—No. 27HC Fox Hyd.
- No. 15—No. 22C—D-25 Fox.
- No. 2—No. 3—No. 4—No. 36 Baush.
- Boley.

GRINDERS

- No. 16—No. 16A Blanchard.
- No. 2 Brown & Sharpe.
- No. 20—No. 22—No. 255 Heald.
- No. 4 Diamond.
- No. 5 Abrasive.
- 14⁸ Model B Pratt & Whitney.
- 8⁸—14⁸ Pratt & Whitney.
- 84⁸ Diamond.
- No. 1 Gardner.
- No. 78 Wilmeth & Morman.
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10"x72"	18"x96"

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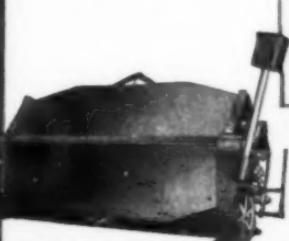
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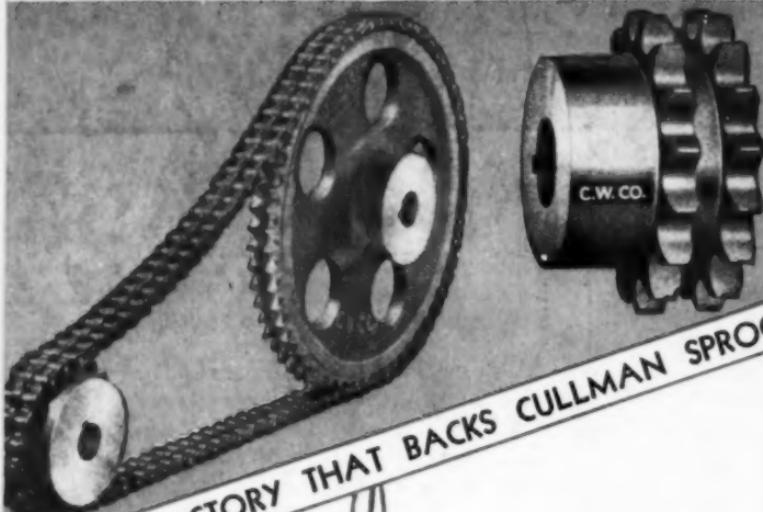
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